MITSUBISHI ELECTRIC

Changes for the Better

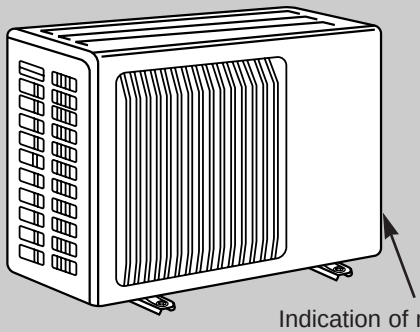
SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

No. OB322

SERVICE MANUAL

Wireless type Models

MUH-A18WV - E1
MUH-A24WV - E1
MUH-A30WV - E1



Indication of model name
MUH-A18WV -E1

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NOTE:
•This service manual describes technical data of outdoor unit.
As for indoor unit MSH-A18WV-E1, MSH-A24WV-E1 and MSH-A30V-E1, refer to the service manual OB321.

CE

1 TECHNICAL CHANGES

MUH-18RV -E2→MUH-A18WV -E1

1. Refrigerant has changed. (R22→R410A)
2. Refrigerant system diagram has changed.
   - Compressor, stop valve and 4-way valve have changed.
   - Diameter of stop valve has changed. (Gas: ϕ15.88→ϕ12.7)
   - Accumulator has removed and high pressure receiver has been added.
3. Oil separator has been added.

MUH-24RV -E1→MUH-A24WV -E1

1. Dimension of outdoor unit has changed.
2. Refrigerant has changed. (R22→R410A)
3. Refrigerant system diagram has changed.
   - Diameter of stop valve has changed. (Liquid: ϕ9.52→ϕ6.35)
   - Accumulator has removed and high pressure receiver has been added.

MUH-30RV -E1→MUH-A30WV -E1

1. Dimension of outdoor unit has changed.
2. Refrigerant has changed. (R22→R410A)
3. Refrigerant system diagram has changed.
   - Accumulator has removed and high pressure receiver has been added.

INFORMATION FOR THE AIR CONDITIONER WITH R410A REFRIGERANT

- This room air conditioner adopts an HFC refrigerant (R410A) which never destroys the ozone layer.
- Pay particular attention to the following points, though the basic installation procedure is same as that for R22 conditioners.

① As R410A has working pressure approximate 1.6 times as high as that of R22, some special tools and piping parts/ materials are required. Refer to the table below.

② Take sufficient care not to allow water and other contaminations to enter the R410A refrigerant during storage and installation, since it is more susceptible to contaminations than R22.

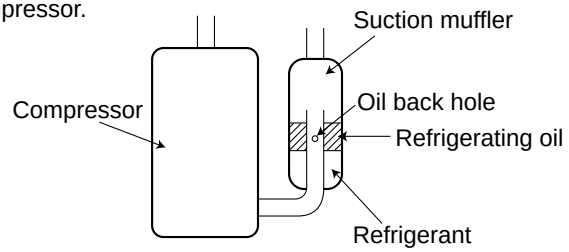
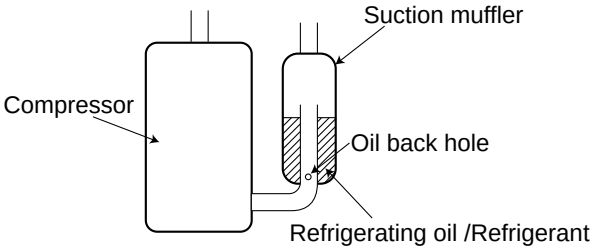
③ For refrigerant piping, use clean, pressure-proof parts/materials specifically designed for R410A. (Refer to 2. Refrigerant piping.)

④ Composition change may occur in R410A since it is a mixed refrigerant. When charging, charge liquid refrigerant to prevent composition change.

		New refrigerant	Previous refrigerant
Refrigerant	Refrigerant	R410A	R22
	Composition (Ratio)	HFC-32: HFC-125 (50%:50%)	R22 (100%)
	Refrigerant handling	Pseudo-azeotropic refrigerant	Single refrigerant
	Chlorine	Not included	Included
	Safety group (ASHRAE)	A1/A1	A1
	Molecular weight	72.6	86.5
	Boiling point (℃)	-51.4	-40.8
	Steam pressure [25℃](Mpa)	1.557	0.94
	Saturated steam density [25℃](Kg/m³)	64	44.4
	Combustibility	Non combustible	Non combustible
	ODP ※1	0	0.055
	GWP ※2	1730	1700
	Refrigerant charge method	From liquid phase in cylinder	Gas phase
	Additional charge on leakage	Possible	Possible
Refrigerating oil	Kind	Incompatible oil	Compatible oil
	Color	Non	Light yellow
	Smell	Non	Non

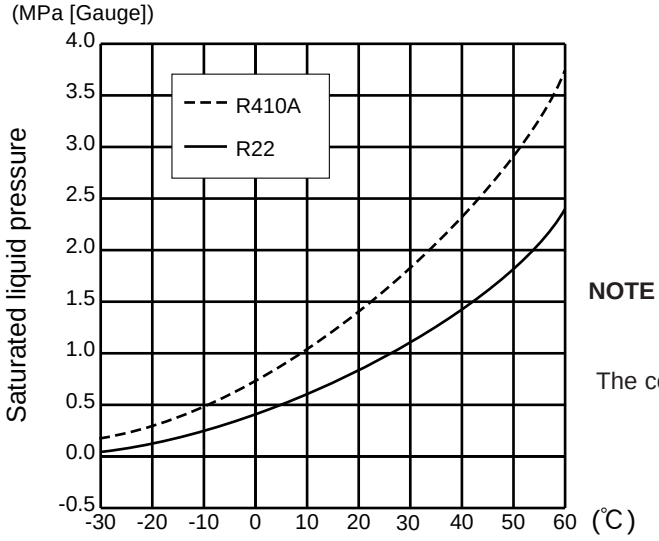
※1 :Ozone Destruction Parameter : based on CFC-11

※2 :Global Warmth Parameter : based on CO_2

	New Specification	Current Specification
Compressor	The incompatible refrigerating oil easily separates from refrigerant and is in the upper layer inside the suction muffler. Raising position of the oil back hole enables to back the refrigerating oil of the upper layer to flow back to the compressor. 	Since refrigerant and refrigerating oil are compatible each, refrigerating oil backs to the compressor through the lower position oil back hole. 

NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

Conversion chart of refrigerant temperature and pressure



NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).

The conversion factor is: **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

1.Tools dedicated for the air conditioner with R410A refrigerant

The following tools are required for R410A refrigerant. Some R22 tools can be substituted for R410A tools.
The diameter of the service port on the stop valve in outdoor unit has been changed to prevent any other refrigerant being charged into the unit. Cap size has been changed from 7/16 UNF with 20 threads to 1/2 UNF with 20 threads.

R410A tools	Can R22 tools be used?	Description
Gauge manifold	No	R410A has high pressures beyond the measurement range of existing gauges. Port diameters have been changed to prevent any other refrigerant from being charged into the unit.
Charge hose	No	Hose material and cap size have been changed to improve the pressure resistance.
Gas leak detector	No	Dedicated for HFC refrigerant.
Torque wrench	Yes	6.35 mm and 9.52 mm
	No	12.7 mm and 15.88 mm
Flare tool	Yes	Clamp bar hole has been enlarged to reinforce the spring strength in the tool.
Flare gauge	New	Provided for flaring work (to be used with R22 flare tool).
Vacuum pump adapter	New	Provided to prevent the back flow of oil. This adapter enables you to use vacuum pumps.
Electronic scale for refrigerant charging	New	It is difficult to measure R410A with a charging cylinder because the refrigerant bubbles due to high pressure and high-speed vaporization

No : Not Substitutable for R410A Yes : Substitutable for R410A

2.Refrigerant piping

① Specifications

Use the refrigerant pipes that meet the following specifications.

Pipe	Outside diameter mm	Wall thickness	Insulation material
For liquid	6.35	0.8 mm	Heat resisting foam plastic Specific gravity 0.045 Thickness 8 mm
	9.52	0.8 mm	
For gas	12.7	0.8 mm	
	15.88	1.0 mm	

- Use a copper pipe or a copper-alloy seamless pipe with a thickness of 0.8 mm (6.35, 9.52, 12.7), 1.0 mm (15.88). Never use any pipe with a thickness less than 0.8 mm (6.35, 9.52, 12.7), 1.0 mm (15.88), as the pressure resistance is insufficient.

② Flaring work and flare nut

Flaring work for R410A pipe differs from that for R22 pipe.

For details of flaring work, refer to Installation manual “FLARING WORK”.

Pipe diameter	Dimension of flare nut	
mm	R410A	R22
6.35	17	17
9.52	22	22
12.7	26	24
15.88	29	27

3.Refrigerant oil

Apply the special refrigeration oil (accessories: packed with indoor unit) to the flare and the union seat surfaces.

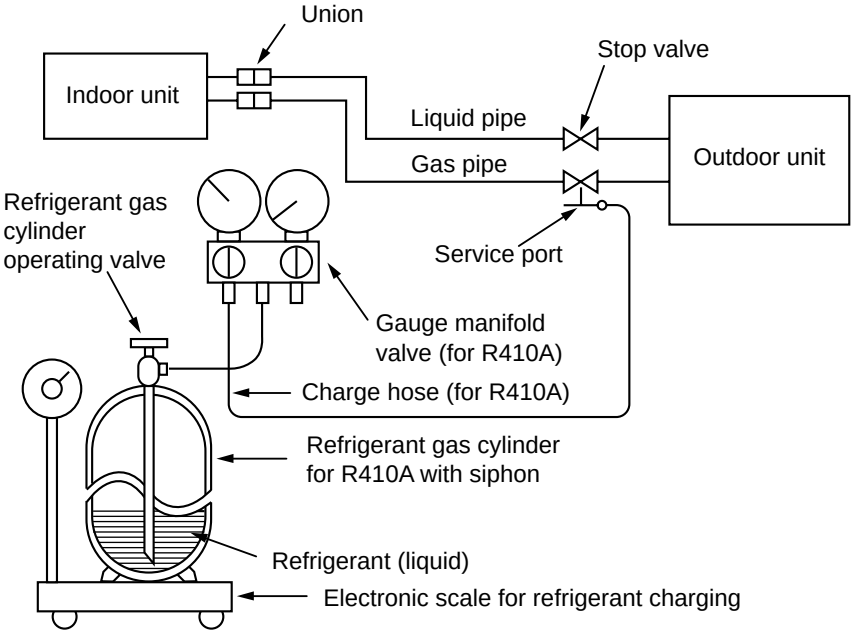
4.Air purge

- Do not discharge the refrigerant into the atmosphere.
  Take care not to discharge refrigerant into the atmosphere during installation, reinstallation, or repairs to the refrigerant circuit.
- Use the vacuum pump for air purging for the purpose of environmental protection.

5.Additional charge

For additional charging, charge the refrigerant from liquid phase of the gas cylinder.

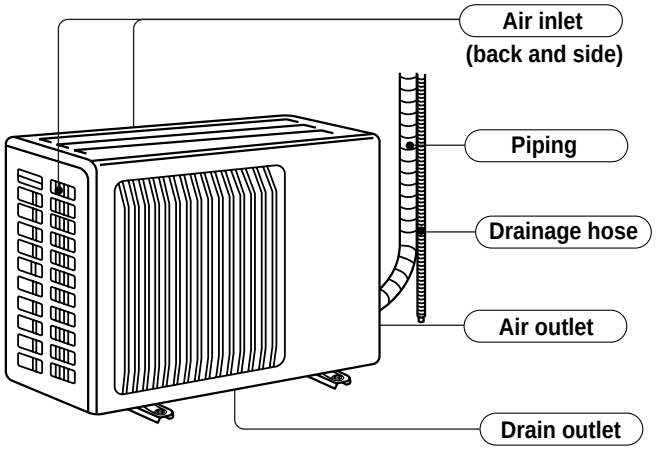
If the refrigerant is charged from the gas phase, composition change may occur in the refrigerant inside the cylinder and the outdoor unit. In this case, ability of the refrigerating cycle decreases or normal operation can be impossible. However, charging the liquid refrigerant all at once may cause the compressor to be locked. Thus, charge the refrigerant slowly.



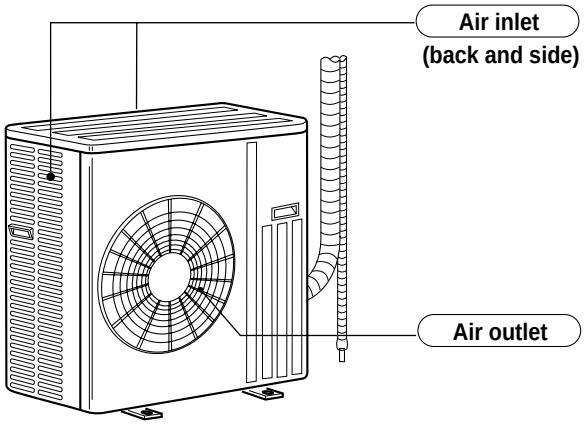
2 PART NAMES AND FUNCTIONS

OUTDOOR UNIT

MUH-A18WV -E1



MUH-A24WV -E1
MUH-A30WV -E1



ACCESSORIES

Outdoor unit

		MUH-A18WV-E1	MUH-A24WV-E1 MUH-A30WV-E1
①	Drain socket	1	1
②	Drain cap ϕ33	2	2
	Drain cap ϕ16	1	—

3 SPECIFICATION

Outdoor model			MUH-A18WV - E1		MUH-A24WV - E1	
Function			Cooling	Heating	Cooling	Heating
Power supply			Single phase 230V, 50Hz		Single phase 230V, 50Hz	
Capacity	Capacity	kW	5.0	5.2	6.3	7.2
	Dehumidification	ℓ /h	2.5	—	3.2	—
	Air flow(High)	m³ /h	2,196		2,760	
Electrical data	Starting current	A	37		74	
	Compressor motor current	A	7.54	6.84	9.81	10.12
	Fan motor current	A	0.39		0.58	
Coefficient of performance(C.O.P)			2.81	3.23	2.61	2.90
Compressor	Model		RN196VHSHT		NN29VBAHT	
	Output	W	1,300		1,900	
	Winding resistance(at20℃)	Ω	C-R 1.80 C-S 3.00		C-R 0.80 C-S 1.64	
Fan motor	Model		RA6V50-OG		RA6V85-AB	
	Winding resistance(at20℃)	Ω	WHT-BLK 116 BLK-RED 111		WHT-BLK 63 BLK-YLW 30 YLW-RED 63	
	Dimensions W×H×D	mm	850×605×290		840×850×330	
	Weight	kg	47		74	
Special remarks	Sound level(High)	dB	52		53	
	Fan speed(High)	rpm	828		730	
	Fan speed regulator		1		1	
	Refrigerant filling capacity(R410A)	kg	1.75		2.15	
	Refrigerating oil (Model)	cc	520 (NEO22)		1,200 (NEO22)	
	Thermistor RT61(at0℃)	kΩ	33.18		33.18	

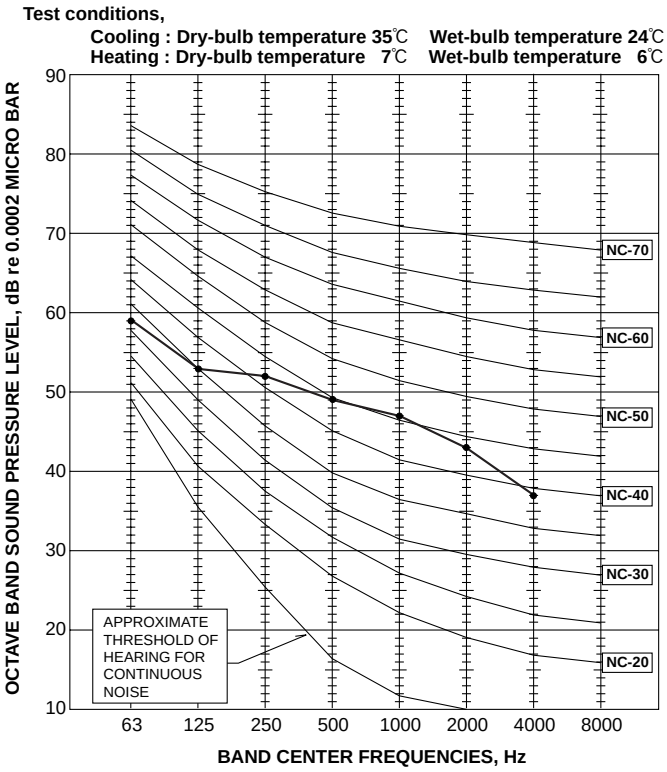
Outdoor model			MUH-A30WV - E1	
Function			Cooling	Heating
Power supply			Single phase 230V, 50Hz	
Capacity	Capacity	kW	8.5	9.4
	Dehumidification	ℓ /h	4.6	—
	Air flow(High/Low※)	m³ /h	2,940/1,470※	2,940/1,470※
Electrical data	Starting current	A	90	
	Compressor motor current	A	13.85	14.62
	Fan motor current	A	0.57	
Coefficient of performance(C.O.P)			2.52-2.40	2.73-2.70
Compressor	Model		NN37VAAHT	
	Output	W	2,500	
	Winding resistance(at20℃)	Ω	C-R 0.64 C-S 1.63	
Fan motor	Model		RA6V75-AB	
	Winding resistance(at20℃)	Ω	WHT-BLK 62.8 BLK-YLW 55.9 YLW-RED 26.0	
	Dimensions W×H×D	mm	840×850×330	
	Weight	kg	77	
Special remarks	Sound level(High)	dB	55	
	Fan speed(High/Low※)	rpm	805/435※	
	Fan speed regulator		2	
	Refrigerant filling capacity(R410A)	kg	2.30	
	Refrigerating oil (Model)	cc	1,300 (NEO 22)	
	Thermistor RT61(at0℃)	kΩ	33.18	
	Thermistor RT62(at25℃)	kΩ	231.44	
	Thermistor RT63(at0℃)	kΩ	33.18	

NOTE: Test conditions are based on JIS C 9612.
Cooling : Indoor DB27°C WB19°C Heating : Indoor DB20°C WB 15.5°C
Outdoor DB35°C WB(24°C) Outdoor DB 7°C WB 6°C
Indoor-Outdoor piping length 5m
※ Reference value

4 NOISE CRITERIA CURVES

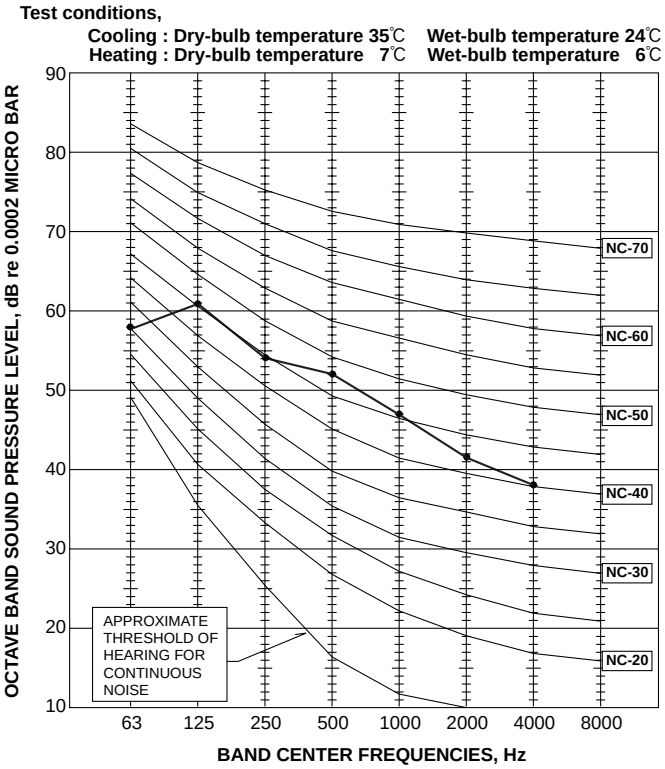
MUH-A18WV-E1

FAN SPEED	SPL(dB(A))	LINE
High	52	



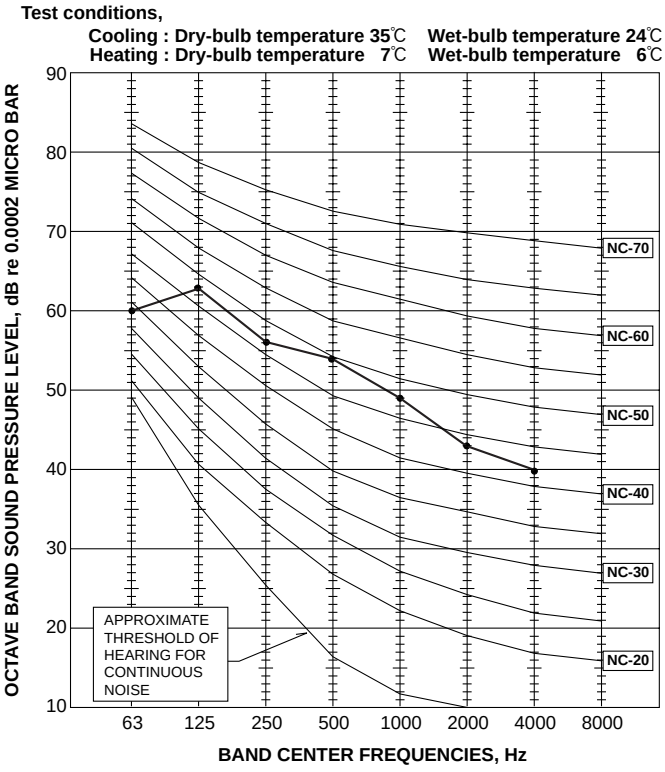
MUH-A24WV-E1

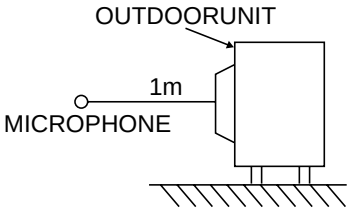
FAN SPEED	SPL(dB(A))	LINE
High	53	



MUH-A30WV-E1

FAN SPEED	SPL(dB(A))	LINE
High	55	



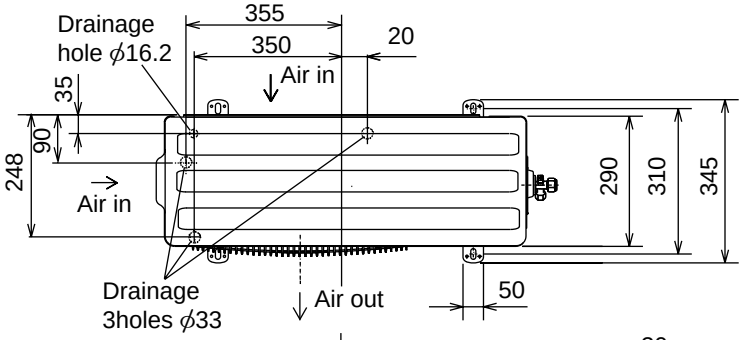


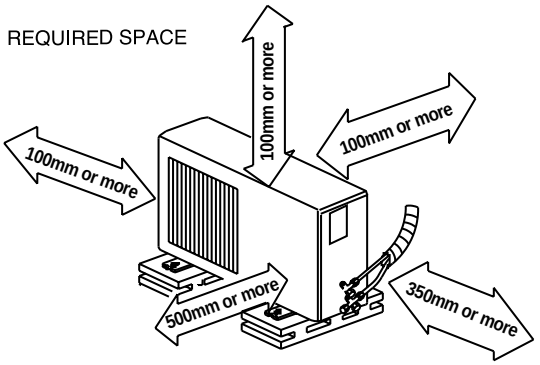
5 OUTLINES AND DIMENSIONS

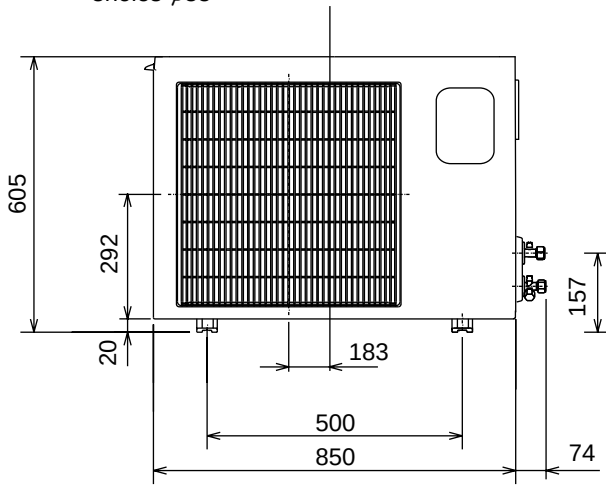
MUH-A18WV-E1

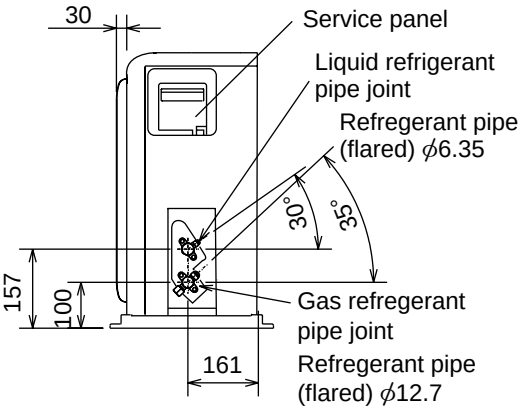
Unit: mm

OUTDOOR UNIT



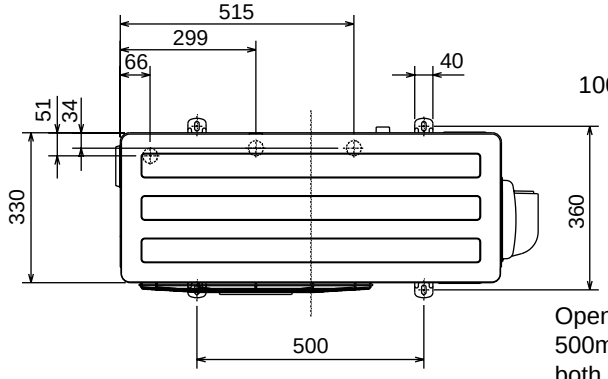


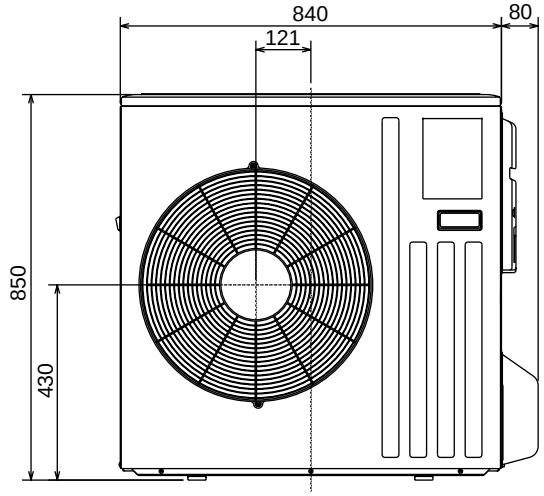


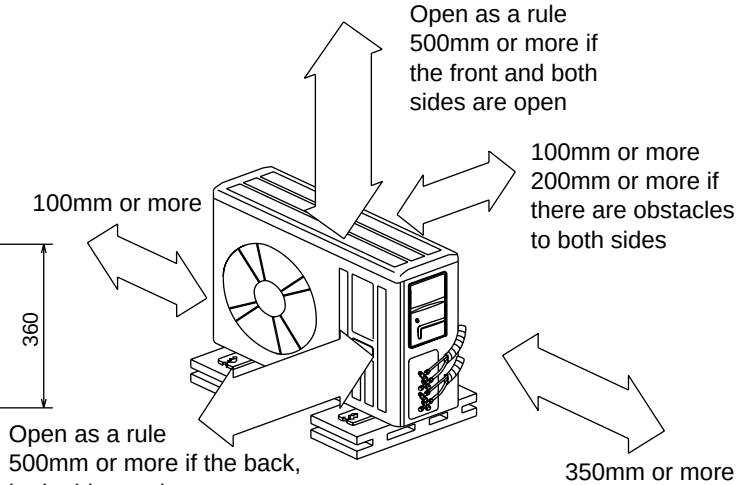


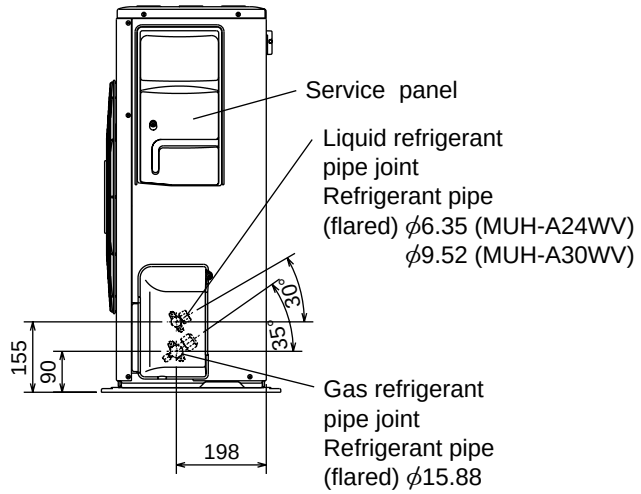
MUH-A24WV-E1 **MUH-A30WV-E1**

OUTDOOR UNIT





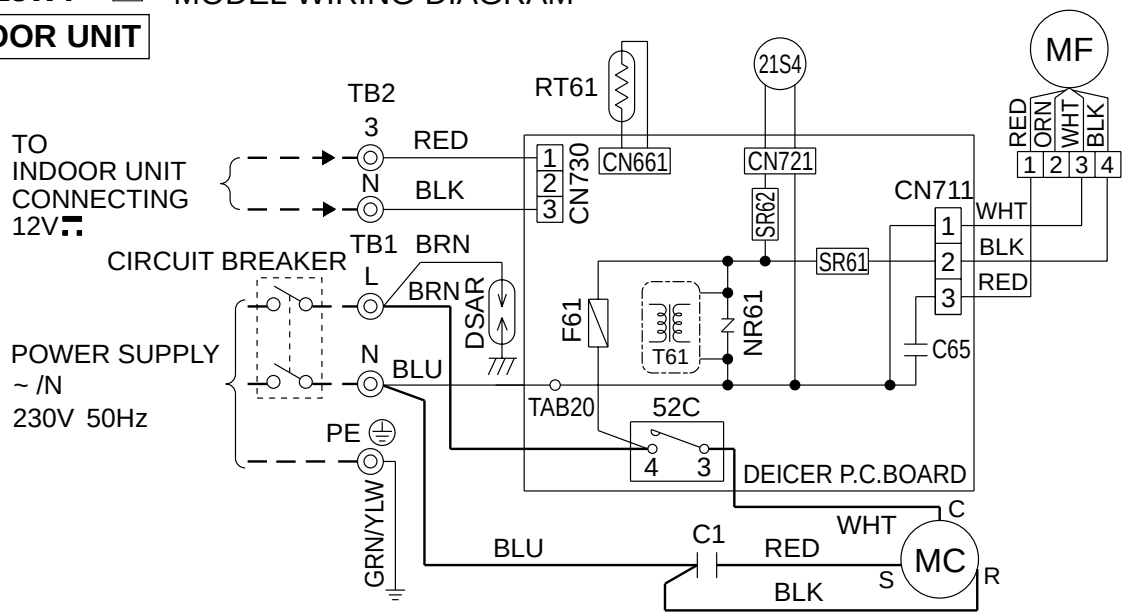

Open as a rule 500mm or more if the front and both sides are open
100mm or more
100mm or more 200mm or more if there are obstacles to both sides
Open as a rule 500mm or more if the back, both sides and top are open
350mm or more



6 WIRING DIAGRAM

MUH-A18WV -E1 MODEL WIRING DIAGRAM

OUTDOOR UNIT



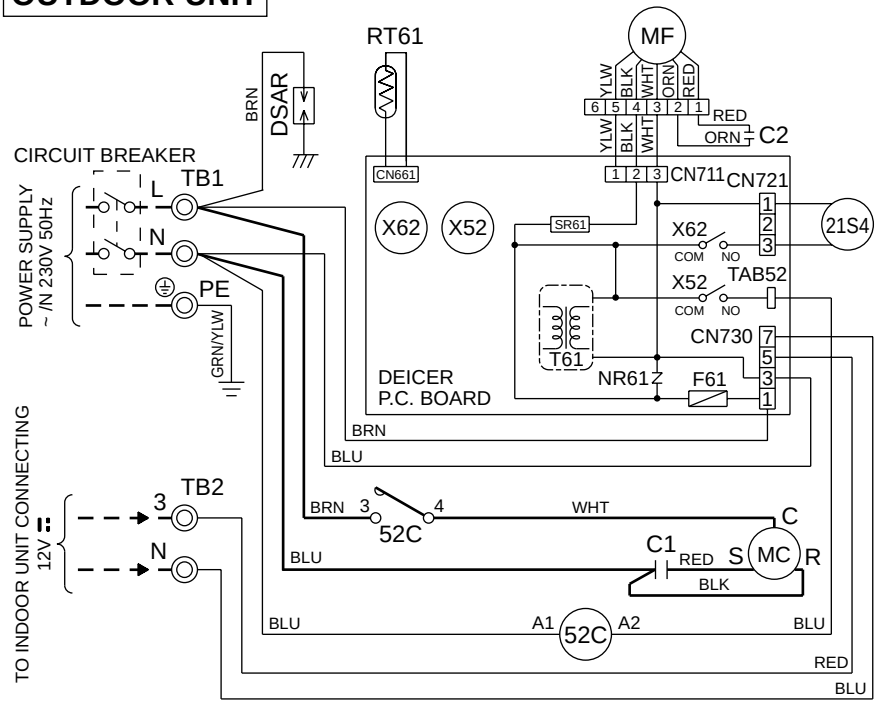
SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	TB1,TB2	TERMINAL BLOCK
C65	OUTDOOR FAN CAPACITOR	NR61	VARISTOR	21S4	R.V. COIL
DSAR	SURGE ABSORBER	RT61	DEFROST THERMISTOR	52C	COMPRESSOR CONTACTOR
F61	FUSE (2A)	SR61,SR62	SOLID STATE RELAY		
MC	COMPRESOR (INNER PROTECTOR)	T61	TRANSFORMER		

NOTES: 1.About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.
2.Use copper conductors only. (For field wiring)
3.Symbols below indicate.
◎ : Terminal block ⊏⊐ : Connector

VG79B553H01

MUH-A24WV -E1 MODEL WIRING DIAGRAM

OUTDOOR UNIT



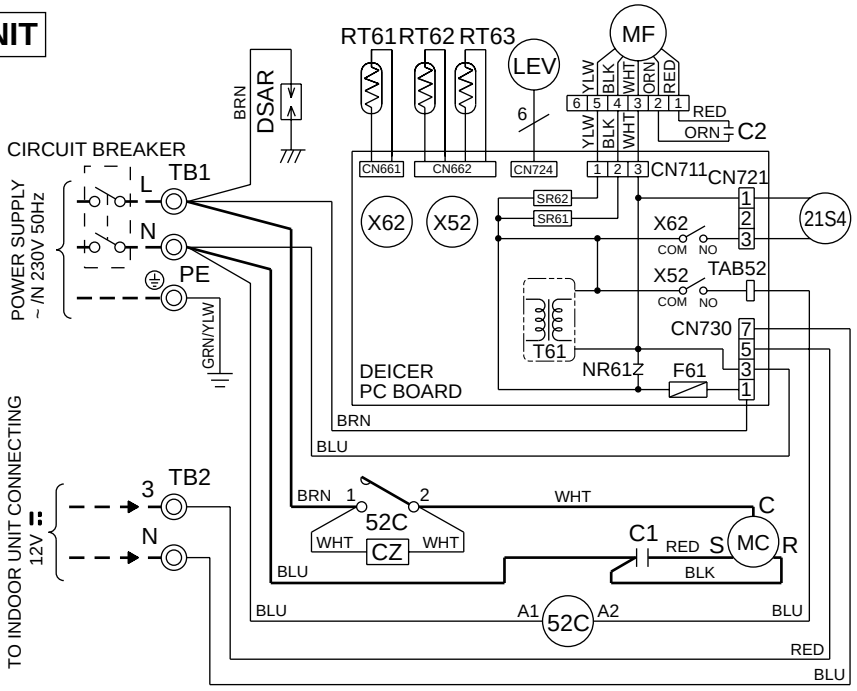
SYMBOL	NAME
C1	COMPRESSOR CAPACITOR
C2	OUTDOOR FAN CAPACITOR
DSAR	SURGE ABSORBER
F61	FUSE (3.15A)
MC	COMPRESSOR (INNER PROTECTOR)
MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)
NR61	VARISTOR
RT61	DEFROST THERMISTOR
SR61	SOLID STATE RELAY
TB1	TERMINAL BLOCK
TB2	TERMINAL BLOCK
T61	TRANSFORMER
X52	CONTACTOR
X62	R. V. COIL RELAY
21S4	R. V. COIL
52C	COMPRESSOR CONTACTOR

SG79J883H01

NOTES: 1.Use copper conductors only (For field wiring).
2.Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers (3,N).
3.Symbols below indicate.
◎: Terminal block, ⊏⊐⊐⊐ : Connector

MUH-A30WV -E1 MODEL WIRING DIAGRAM

OUTDOOR UNIT



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CZ	CZ SURGE ABSRBER	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	TB1	TERMINAL BLOCK
C1	COMPRESSOR CAPACITOR	NR61	VARISTOR	TB2	TERMINAL BLOCK
C2	OUTDOOR FAN CAPACITOR	RT61	DEFROST THERMISTOR	T61	TRANSFORMER
DSAR	SURGE ABSORBER	RT62	DISCHARGE TEMPERATURE THERMISTOR	X52	CONTACTOR
F61	FUSE(3.15A)	RT63	AMBIENT TEMPERATURE THERMISTOR	X62	R.V. COIL RELAY
LEV	EXPANSION VALVE COIL	SR61	SOLID STATE RELAY	21S4	R.V. COIL
MC	COMPRESSOR (INNER PROTECTOR)	SR62	SOLID STATE RELAY	52C	COMPRESSOR CONTACTOR

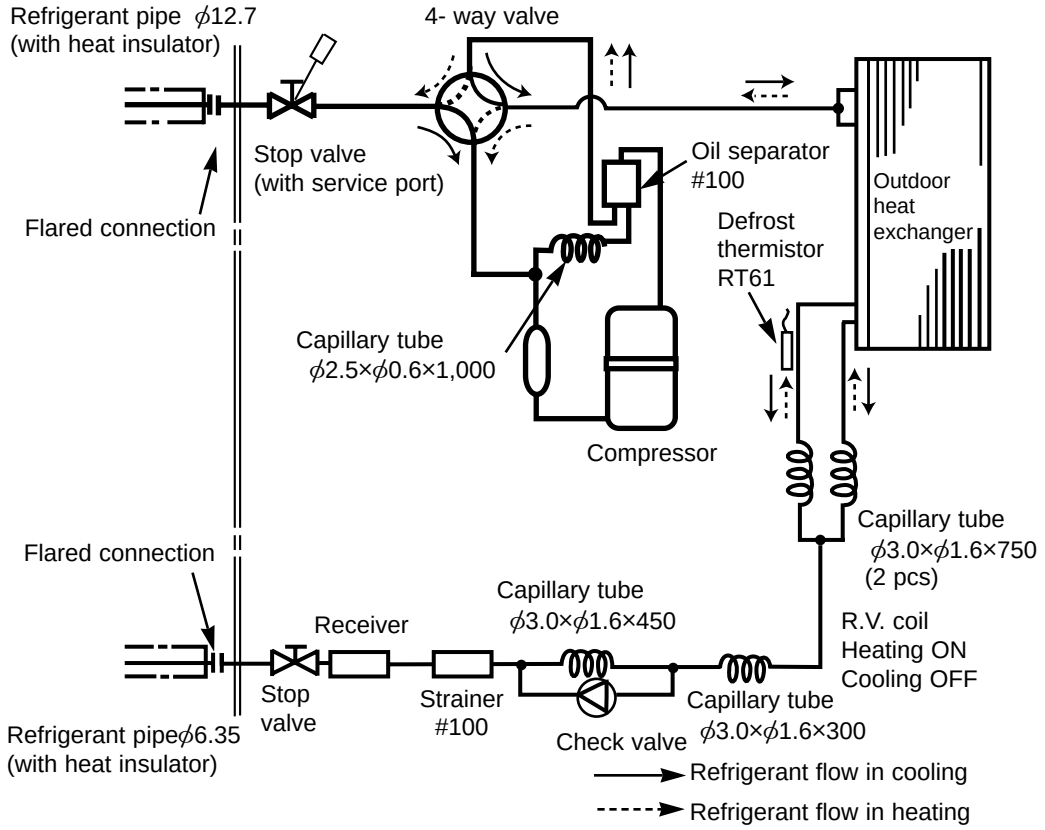
NOTE 1. Use copper conductors only (For field wiring).
2. Since the indoor and outdoor unit connecting wires have polarity, connect them according to the numbers (3,N).
3. Symbols below indicate.
◎: Terminal block, □□□□ : Connector

SG79J882H01

7 REFRIGERANT SYSTEM DIAGRAM

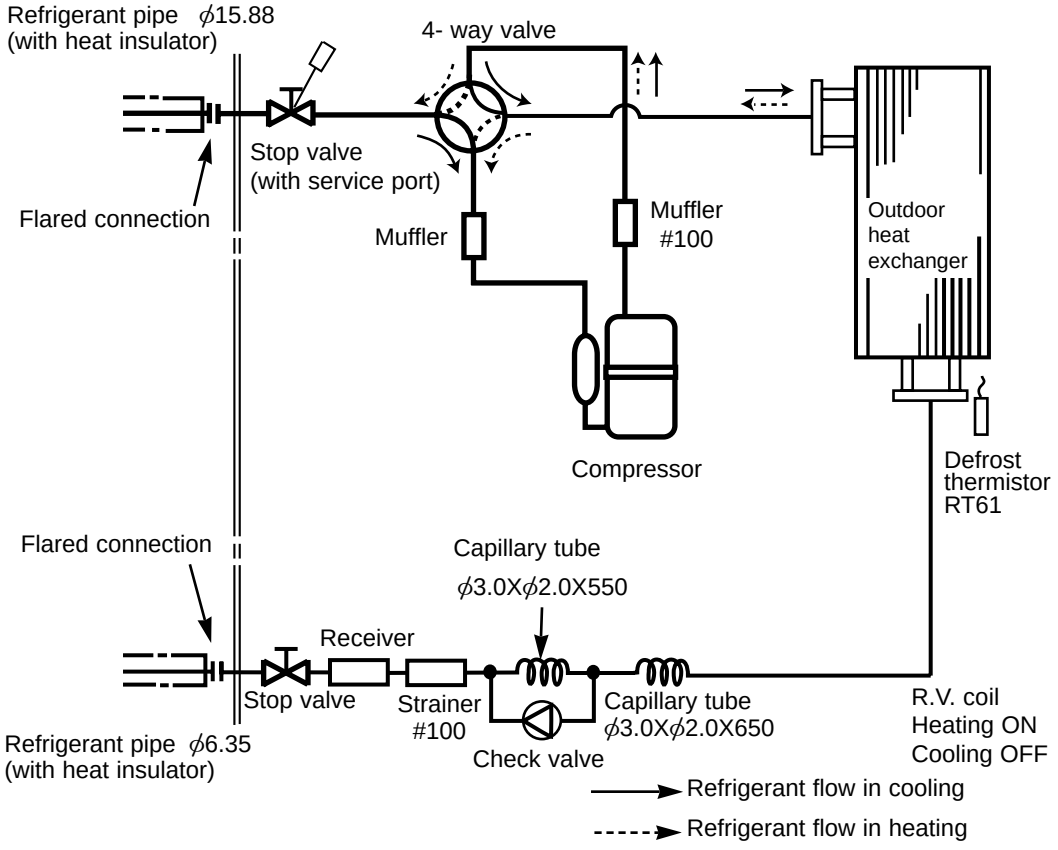
MUH-A18WV -E1 **Unit:mm**

OUTDOOR UNIT



MUH-A24WV -E1

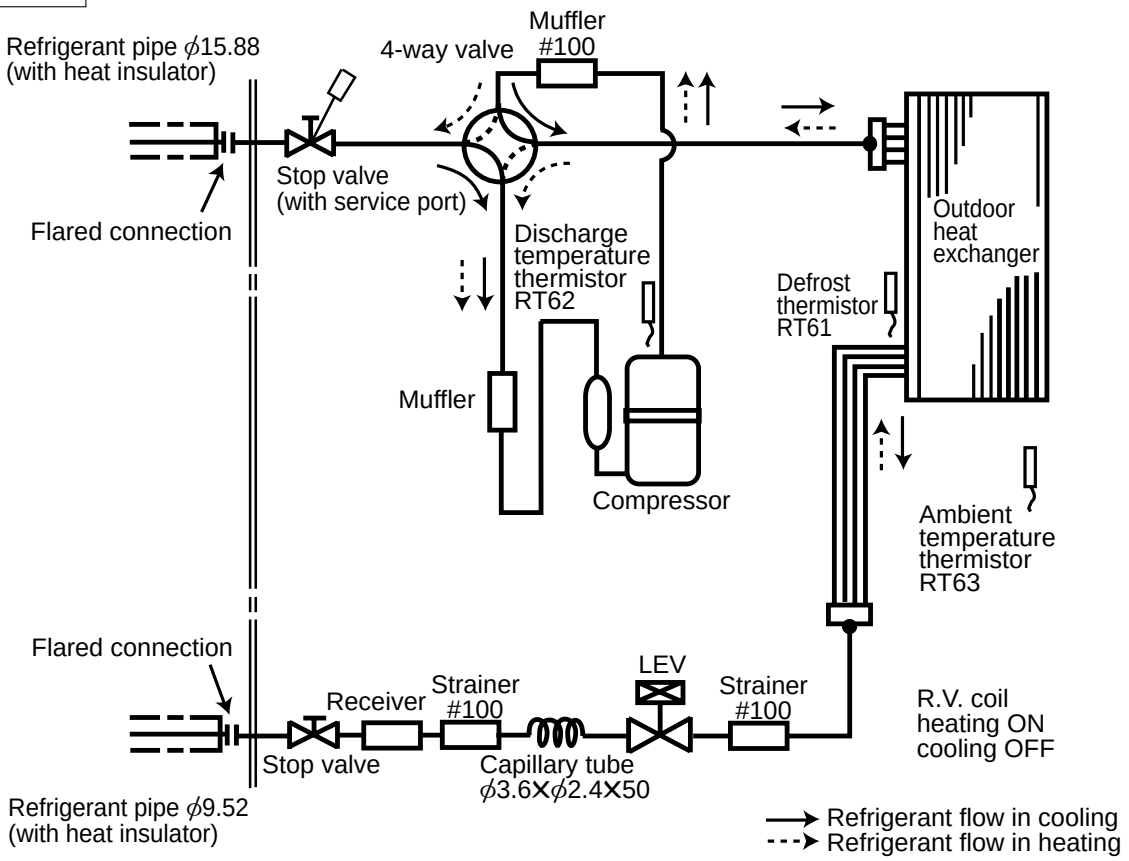
OUTDOOR UNIT



MUH-A30WV - E1

Unit:mm

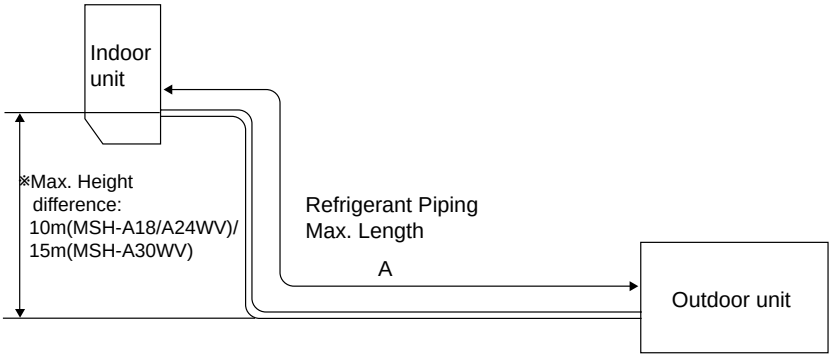
OUTDOOR UNIT



MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping Max. length : m	Piping size O.D : mm		Length of connecting pipe : m	
	A	Gas	Liquid	Indoor unit	Outdoor unit
MUH-A18WV - E1	25	12.7	6.35	Gas 0.43 Liquid 0.5	Gas 0 Liquid 0
MUH-A24WV - E1		15.88			
MUH-A30WV - E1	30		9.52		

MAX. HEIGHT DIFFERENCE



※ Height difference should be within 10m(MSH-A18/A24WV)/
15m(MSH-A30WV) regardless of which unit, indoor or outdoor position is high.

ADDITIONAL REFRIGERANT CHARGE(R410A : g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)				
		7m	10m	15m	20m	25m
MUH-A18WV - E1	1,750	0	60	160	260	360

Calculation : Xg=20g/m × (Refrigerant piping length (m)–7)

Model	Outdoor unit precharged	Refrigerant piping length (one way)				
		7m	10m	15m	20m	25m
MUH-A24WV - E1	2,150	0	60	160	260	360

Calculation : Xg=20g/m × (Refrigerant piping length (m)–7)

Model	Outdoor unit precharged	Refrigerant piping length (one way)					
		7m	10m	15m	20m	25m	30m
MUH-A30WV - E1	2,300	0	165	440	715	990	1,265

Calculation : Xg=55g/m×(Refrigerant piping length(m)-7)

8 PERFORMANCE CURVES

MUH-A18WV -E1 MUH-A24WV -E1 MUH-A30WV -E1

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions, since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE

198 ~ 264V, 50Hz

(2) AIR FLOW

Air flow should be set at MAX.

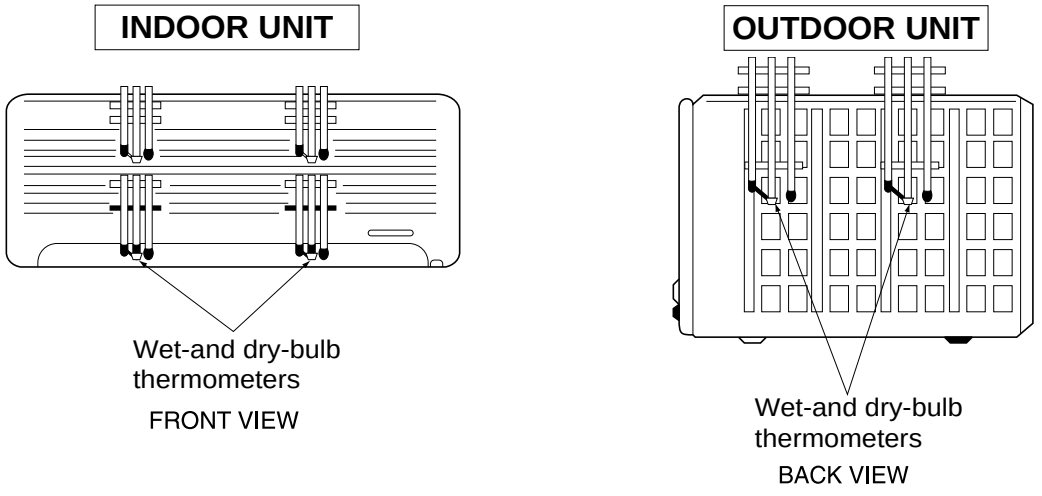
(3) MAIN READINGS

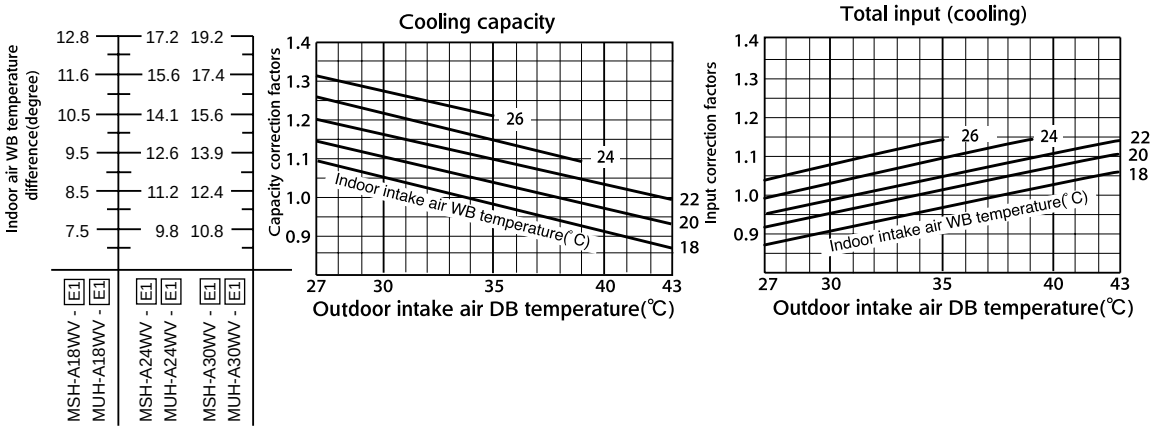
(1) Indoor intake air wet-bulb temperature :	°CWB	Cooling
(2) Indoor outlet air wet-bulb temperature :	°CWB	
(3) Outdoor intake air dry-bulb temperature :	°CDB	
(4) Total input:	W	
(5) Indoor intake air dry-bulb temperature :	°CDB	Heating
(6) Outdoor intake air wet-bulb temperature :	°CWB	
(7) Total input :	W	

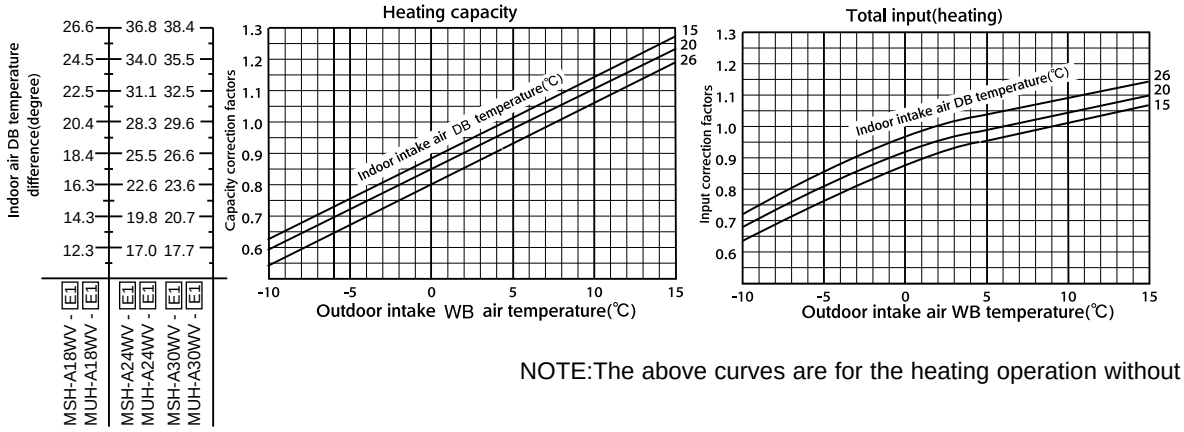
Indoor air wet/dry-bulb temperature difference on the left side of the chart on this page and next page shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry-bulb temperature for your reference at service.

How to measure the indoor air wet-bulb/dry-bulb temperature difference

1. Attach at least 2 sets of wet-and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet-and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of wet-and dry-bulb thermometers to the outdoor air intake. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of room.
5. Press the EMERGENCY OPERATION switch once(twice) to start the EMERGENCY COOL(HEAT) MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.







NOTE:The above curves are for the heating operation without any frost.

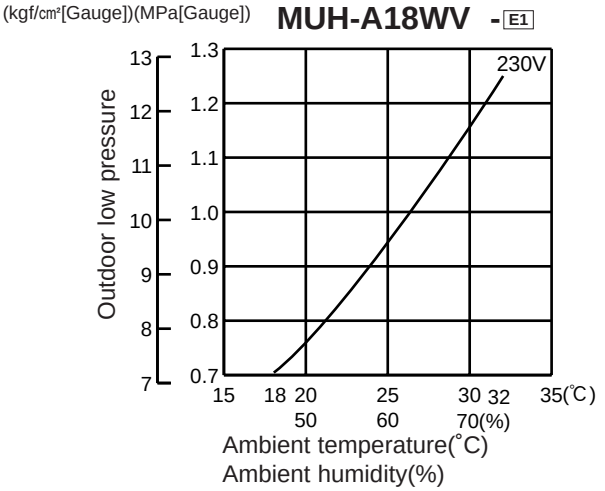
OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT
COOL operation

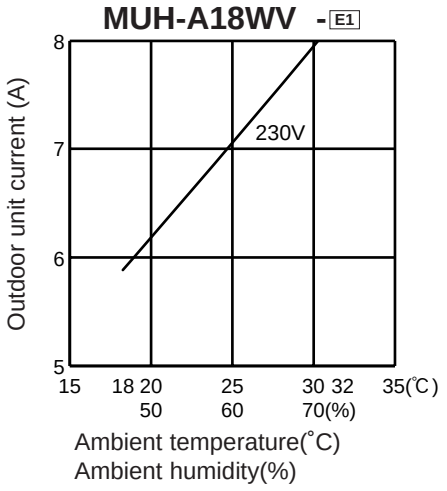
① Both indoor and outdoor unit are under the same temperature/humidity condition.

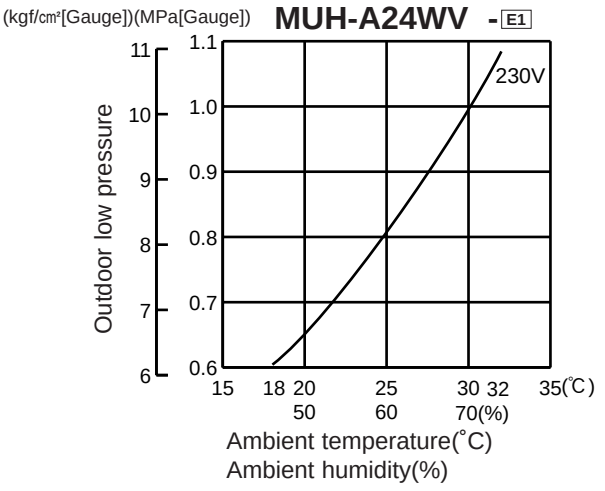
Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

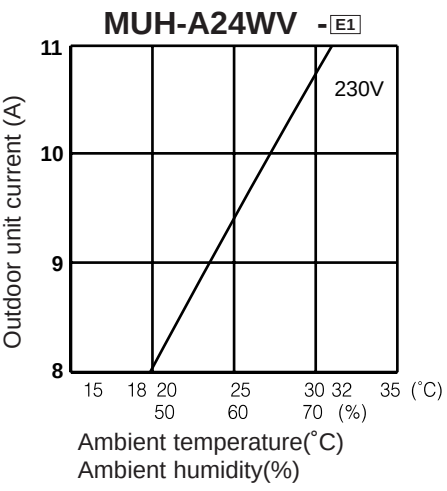
② Air flow should be set at MAX.

③ The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is : **1(MPa [Gauge]) =10.2(kgf/㎠ [Gauge])**

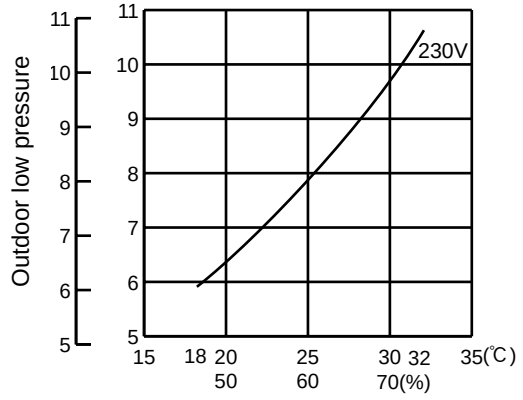






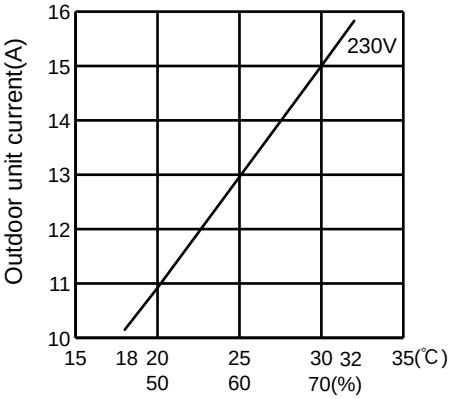


(kgf/㎠[Gauge])(MPa[Gauge]) **MUH-A30WV -E1**



Ambient temperature(˚C)
Ambient humidity(%)

MUH-A30WV -E1



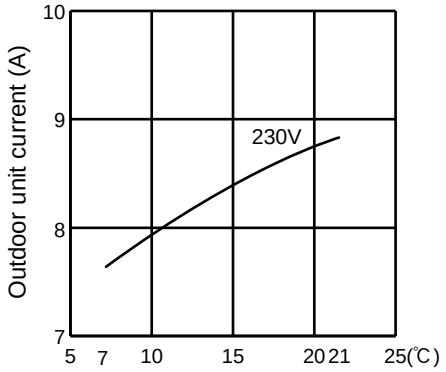
Ambient temperature(˚C)
Ambient humidity(%)

HEAT operation

Condition indoor:Dry bulb temperature 20.0°C
Wet bulb temperature 14.5°C

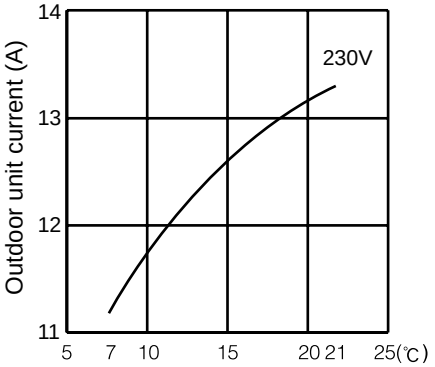
Outdoor:Dry bulb temperature 7,15,20°C
Wet bulb temperature 6,12,14.5°C

MUH-A18WV -E1



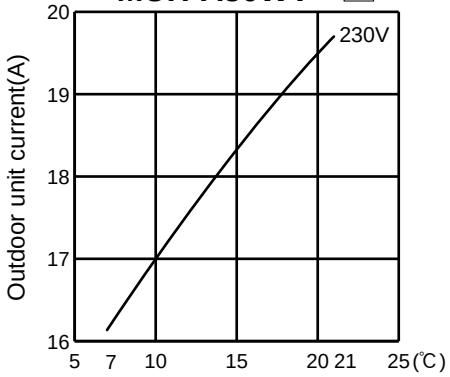
Ambient temperature(˚C)

MUH-A24WV -E1



Ambient temperature(˚C)

MUH-A30WV -E1



Ambient temperature(˚C)

PERFORMANCE DATA COOL operation

MSH-A18WV -E1 : MUH-A18WV -E1 (230V)

CAPACITY : 5.0(KW) SHF : 0.65 INPUT : 1780(W)

		OUTDOOR DB(℃)															
INDOOR	INDOOR	21				25				27				30			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	5.88	2.76	0.47	1424	5.63	2.64	0.47	1495	5.40	2.54	0.47	1566	5.20	2.44	0.47	1638
21	20	6.13	2.14	0.35	1495	5.88	2.06	0.35	1584	5.70	2.00	0.35	1620	5.50	1.93	0.35	1691
22	18	5.88	3.00	0.51	1424	5.63	2.87	0.51	1495	5.40	2.75	0.51	1566	5.20	2.65	0.51	1638
22	20	6.13	2.39	0.39	1495	5.88	2.29	0.39	1584	5.70	2.22	0.39	1620	5.50	2.15	0.39	1691
22	22	6.38	1.72	0.27	1549	6.15	1.66	0.27	1647	6.00	1.62	0.27	1691	5.75	1.55	0.27	1762
23	18	5.88	3.23	0.55	1424	5.63	3.09	0.55	1495	5.40	2.97	0.55	1566	5.20	2.86	0.55	1638
23	20	6.13	2.63	0.43	1495	5.88	2.53	0.43	1584	5.70	2.45	0.43	1620	5.50	2.37	0.43	1691
23	22	6.38	1.98	0.31	1549	6.15	1.91	0.31	1647	6.00	1.86	0.31	1691	5.75	1.78	0.31	1762
24	18	5.88	3.47	0.59	1424	5.63	3.32	0.59	1495	5.40	3.19	0.59	1566	5.20	3.07	0.59	1638
24	20	6.13	2.88	0.47	1495	5.88	2.76	0.47	1584	5.70	2.68	0.47	1620	5.50	2.59	0.47	1691
24	22	6.38	2.23	0.35	1549	6.15	2.15	0.35	1647	6.00	2.10	0.35	1691	5.75	2.01	0.35	1762
24	24	6.70	1.54	0.23	1620	6.45	1.48	0.23	1709	6.30	1.45	0.23	1762	6.10	1.40	0.23	1851
25	18	5.88	3.70	0.63	1424	5.63	3.54	0.63	1495	5.40	3.40	0.63	1566	5.20	3.28	0.63	1638
25	20	6.13	3.12	0.51	1495	5.88	3.00	0.51	1584	5.70	2.91	0.51	1620	5.50	2.81	0.51	1691
25	22	6.38	2.49	0.39	1549	6.15	2.40	0.39	1647	6.00	2.34	0.39	1691	5.75	2.24	0.39	1762
25	24	6.70	1.81	0.27	1620	6.45	1.74	0.27	1709	6.30	1.70	0.27	1762	6.10	1.65	0.27	1851
26	18	5.88	3.94	0.67	1424	5.63	3.77	0.67	1495	5.40	3.62	0.67	1566	5.20	3.48	0.67	1638
26	20	6.13	3.37	0.55	1495	5.88	3.23	0.55	1584	5.70	3.14	0.55	1620	5.50	3.03	0.55	1691
26	22	6.38	2.74	0.43	1549	6.15	2.64	0.43	1647	6.00	2.58	0.43	1691	5.75	2.47	0.43	1762
26	24	6.70	2.08	0.31	1620	6.45	2.00	0.31	1709	6.30	1.95	0.31	1762	6.10	1.89	0.31	1851
26	26	6.90	1.31	0.19	1709	6.70	1.27	0.19	1798	6.60	1.25	0.19	1851	6.40	1.22	0.19	1905
27	18	5.88	4.17	0.71	1424	5.63	3.99	0.71	1495	5.40	3.83	0.71	1566	5.20	3.69	0.71	1638
27	20	6.13	3.61	0.59	1495	5.88	3.47	0.59	1584	5.70	3.36	0.59	1620	5.50	3.25	0.59	1691
27	22	6.38	3.00	0.47	1549	6.15	2.89	0.47	1647	6.00	2.82	0.47	1691	5.75	2.70	0.47	1762
27	24	6.70	2.35	0.35	1620	6.45	2.26	0.35	1709	6.30	2.21	0.35	1762	6.10	2.14	0.35	1851
27	26	6.90	1.59	0.23	1709	6.70	1.54	0.23	1798	6.60	1.52	0.23	1851	6.40	1.47	0.23	1905
28	18	5.88	4.41	0.75	1424	5.63	4.22	0.75	1495	5.40	4.05	0.75	1566	5.20	3.90	0.75	1638
28	20	6.13	3.86	0.63	1495	5.88	3.70	0.63	1584	5.70	3.59	0.63	1620	5.50	3.47	0.63	1691
28	22	6.38	3.25	0.51	1549	6.15	3.14	0.51	1647	6.00	3.06	0.51	1691	5.75	2.93	0.51	1762
28	24	6.70	2.61	0.39	1620	6.45	2.52	0.39	1709	6.30	2.46	0.39	1762	6.10	2.38	0.39	1851
28	26	6.90	1.86	0.27	1709	6.70	1.81	0.27	1798	6.60	1.78	0.27	1851	6.40	1.73	0.27	1905
29	18	5.88	4.64	0.79	1424	5.63	4.44	0.79	1495	5.40	4.27	0.79	1566	5.20	4.11	0.79	1638
29	20	6.13	4.10	0.67	1495	5.88	3.94	0.67	1584	5.70	3.82	0.67	1620	5.50	3.69	0.67	1691
29	22	6.38	3.51	0.55	1549	6.15	3.38	0.55	1647	6.00	3.30	0.55	1691	5.75	3.16	0.55	1762
29	24	6.70	2.88	0.43	1620	6.45	2.77	0.43	1709	6.30	2.71	0.43	1762	6.10	2.62	0.43	1851
29	26	6.90	2.14	0.31	1709	6.70	2.08	0.31	1798	6.60	2.05	0.31	1851	6.40	1.98	0.31	1905
30	18	5.88	4.88	0.83	1424	5.63	4.67	0.83	1495	5.40	4.48	0.83	1566	5.20	4.32	0.83	1638
30	20	6.13	4.35	0.71	1495	5.88	4.17	0.71	1584	5.70	4.05	0.71	1620	5.50	3.91	0.71	1691
30	22	6.38	3.76	0.59	1549	6.15	3.63	0.59	1647	6.00	3.54	0.59	1691	5.75	3.39	0.59	1762
30	24	6.70	3.15	0.47	1620	6.45	3.03	0.47	1709	6.30	2.96	0.47	1762	6.10	2.87	0.47	1851
30	26	6.90	2.42	0.35	1709	6.70	2.35	0.35	1798	6.60	2.31	0.35	1851	6.40	2.24	0.35	1905
31	18	5.88	5.11	0.87	1424	5.63	4.89	0.87	1495	5.40	4.70	0.87	1566	5.20	4.52	0.87	1638
31	20	6.13	4.59	0.75	1495	5.88	4.41	0.75	1584	5.70	4.28	0.75	1620	5.50	4.13	0.75	1691
31	22	6.38	4.02	0.63	1549	6.15	3.87	0.63	1647	6.00	3.78	0.63	1691	5.75	3.62	0.63	1762
31	24	6.70	3.42	0.51	1620	6.45	3.29	0.51	1709	6.30	3.21	0.51	1762	6.10	3.11	0.51	1851
31	26	6.90	2.69	0.39	1709	6.70	2.61	0.39	1798	6.60	2.57	0.39	1851	6.40	2.50	0.39	1905
32	18	5.88	5.35	0.91	1424	5.63	5.12	0.91	1495	5.40	4.91	0.91	1566	5.20	4.73	0.91	1638
32	20	6.13	4.84	0.79	1495	5.88	4.64	0.79	1584	5.70	4.50	0.79	1620	5.50	4.35	0.79	1691
32	22	6.38	4.27	0.67	1549	6.15	4.12	0.67	1647	6.00	4.02	0.67	1691	5.75	3.85	0.67	1762
32	24	6.70	3.69	0.55	1620	6.45	3.55	0.55	1709	6.30	3.47	0.55	1762	6.10	3.36	0.55	1851
32	26	6.90	2.97	0.43	1709	6.70	2.88	0.43	1798	6.60	2.84	0.43	1851	6.40	2.75	0.43	1905

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MSH-A18WV -E1 : MUH-A18WV -E1 (230V)

CAPACITY : 5.0(KW) SHF : 0.65 INPUT : 1780(W)

		OUTDOOR DB(℃)											
INDOOR DB(℃)	INDOOR WB(℃)	35				40				43			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	4.90	2.30	0.47	1744	4.50	2.12	0.47	1851	4.33	2.03	0.47	1887
21	20	5.15	1.80	0.35	1816	4.80	1.68	0.35	1905	4.63	1.62	0.35	1958
22	18	4.90	2.50	0.51	1744	4.50	2.30	0.51	1851	4.33	2.21	0.51	1887
22	20	5.15	2.01	0.39	1816	4.80	1.87	0.39	1905	4.63	1.80	0.39	1958
22	22	5.45	1.47	0.27	1887	5.10	1.38	0.27	1994	4.93	1.33	0.27	2029
23	18	4.90	2.70	0.55	1744	4.50	2.48	0.55	1851	4.33	2.38	0.55	1887
23	20	5.15	2.21	0.43	1816	4.80	2.06	0.43	1905	4.63	1.99	0.43	1958
23	22	5.45	1.69	0.31	1887	5.10	1.58	0.31	1994	4.93	1.53	0.31	2029
24	18	4.90	2.89	0.59	1744	4.50	2.66	0.59	1851	4.33	2.55	0.59	1887
24	20	5.15	2.42	0.47	1816	4.80	2.26	0.47	1905	4.63	2.17	0.47	1958
24	22	5.45	1.91	0.35	1887	5.10	1.79	0.35	1994	4.93	1.72	0.35	2029
24	24	5.75	1.32	0.23	1958	5.40	1.24	0.23	2047	5.25	1.21	0.23	2092
25	18	4.90	3.09	0.63	1744	4.50	2.84	0.63	1851	4.33	2.72	0.63	1887
25	20	5.15	2.63	0.51	1816	4.80	2.45	0.51	1905	4.63	2.36	0.51	1958
25	22	5.45	2.13	0.39	1887	5.10	1.99	0.39	1994	4.93	1.92	0.39	2029
25	24	5.75	1.55	0.27	1958	5.40	1.46	0.27	2047	5.25	1.42	0.27	2092
26	18	4.90	3.28	0.67	1744	4.50	3.02	0.67	1851	4.33	2.90	0.67	1887
26	20	5.15	2.83	0.55	1816	4.80	2.64	0.55	1905	4.63	2.54	0.55	1958
26	22	5.45	2.34	0.43	1887	5.10	2.19	0.43	1994	4.93	2.12	0.43	2029
26	24	5.75	1.78	0.31	1958	5.40	1.67	0.31	2047	5.25	1.63	0.31	2092
26	26	6.05	1.15	0.19	2029	5.70	1.08	0.19	2118	5.53	1.05	0.19	2163
27	18	4.90	3.48	0.71	1744	4.50	3.20	0.71	1851	4.33	3.07	0.71	1887
27	20	5.15	3.04	0.59	1816	4.80	2.83	0.59	1905	4.63	2.73	0.59	1958
27	22	5.45	2.56	0.47	1887	5.10	2.40	0.47	1994	4.93	2.31	0.47	2029
27	24	5.75	2.01	0.35	1958	5.40	1.89	0.35	2047	5.25	1.84	0.35	2092
27	26	6.05	1.39	0.23	2029	5.70	1.31	0.23	2118	5.53	1.27	0.23	2163
28	18	4.90	3.68	0.75	1744	4.50	3.38	0.75	1851	4.33	3.24	0.75	1887
28	20	5.15	3.24	0.63	1816	4.80	3.02	0.63	1905	4.63	2.91	0.63	1958
28	22	5.45	2.78	0.51	1887	5.10	2.60	0.51	1994	4.93	2.51	0.51	2029
28	24	5.75	2.24	0.39	1958	5.40	2.11	0.39	2047	5.25	2.05	0.39	2092
28	26	6.05	1.63	0.27	2029	5.70	1.54	0.27	2118	5.53	1.49	0.27	2163
29	18	4.90	3.87	0.79	1744	4.50	3.56	0.79	1851	4.33	3.42	0.79	1887
29	20	5.15	3.45	0.67	1816	4.80	3.22	0.67	1905	4.63	3.10	0.67	1958
29	22	5.45	3.00	0.55	1887	5.10	2.81	0.55	1994	4.93	2.71	0.55	2029
29	24	5.75	2.47	0.43	1958	5.40	2.32	0.43	2047	5.25	2.26	0.43	2092
29	26	6.05	1.88	0.31	2029	5.70	1.77	0.31	2118	5.53	1.71	0.31	2163
30	18	4.90	4.07	0.83	1744	4.50	3.74	0.83	1851	4.33	3.59	0.83	1887
30	20	5.15	3.66	0.71	1816	4.80	3.41	0.71	1905	4.63	3.28	0.71	1958
30	22	5.45	3.22	0.59	1887	5.10	3.01	0.59	1994	4.93	2.91	0.59	2029
30	24	5.75	2.70	0.47	1958	5.40	2.54	0.47	2047	5.25	2.47	0.47	2092
30	26	6.05	2.12	0.35	2029	5.70	2.00	0.35	2118	5.53	1.93	0.35	2163
31	18	4.90	4.26	0.87	1744	4.50	3.92	0.87	1851	4.33	3.76	0.87	1887
31	20	5.15	3.86	0.75	1816	4.80	3.60	0.75	1905	4.63	3.47	0.75	1958
31	22	5.45	3.43	0.63	1887	5.10	3.21	0.63	1994	4.93	3.10	0.63	2029
31	24	5.75	2.93	0.51	1958	5.40	2.75	0.51	2047	5.25	2.68	0.51	2092
31	26	6.05	2.36	0.39	2029	5.70	2.22	0.39	2118	5.53	2.15	0.39	2163
32	18	4.90	4.46	0.91	1744	4.50	4.10	0.91	1851	4.33	3.94	0.91	1887
32	20	5.15	4.07	0.79	1816	4.80	3.79	0.79	1905	4.63	3.65	0.79	1958
32	22	5.45	3.65	0.67	1887	5.10	3.42	0.67	1994	4.93	3.30	0.67	2029
32	24	5.75	3.16	0.55	1958	5.40	2.97	0.55	2047	5.25	2.89	0.55	2092
32	26	6.05	2.60	0.43	2029	5.70	2.45	0.43	2118	5.53	2.38	0.43	2163

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MSH-A24WV -E1 : MUH-A24WV -E1 (230V)

CAPACITY : 6.3(KW) SHF : 0.64 INPUT : 2410(W)

		OUTDOOR DB(℃)															
INDOOR	INDOOR	21				25				27				30			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	7.40	3.41	0.46	1928	7.09	3.26	0.46	2024	6.80	3.13	0.46	2121	6.55	3.01	0.46	2217
21	20	7.72	2.62	0.34	2024	7.40	2.52	0.34	2145	7.18	2.44	0.34	2193	6.93	2.36	0.34	2290
22	18	7.40	3.70	0.50	1928	7.09	3.54	0.50	2024	6.80	3.40	0.50	2121	6.55	3.28	0.50	2217
22	20	7.72	2.93	0.38	2024	7.40	2.81	0.38	2145	7.18	2.73	0.38	2193	6.93	2.63	0.38	2290
22	22	8.03	2.09	0.26	2097	7.75	2.01	0.26	2229	7.56	1.97	0.26	2290	7.25	1.88	0.26	2386
23	18	7.40	4.00	0.54	1928	7.09	3.83	0.54	2024	6.80	3.67	0.54	2121	6.55	3.54	0.54	2217
23	20	7.72	3.24	0.42	2024	7.40	3.11	0.42	2145	7.18	3.02	0.42	2193	6.93	2.91	0.42	2290
23	22	8.03	2.41	0.30	2097	7.75	2.32	0.30	2229	7.56	2.27	0.30	2290	7.25	2.17	0.30	2386
24	18	7.40	4.29	0.58	1928	7.09	4.11	0.58	2024	6.80	3.95	0.58	2121	6.55	3.80	0.58	2217
24	20	7.72	3.55	0.46	2024	7.40	3.41	0.46	2145	7.18	3.30	0.46	2193	6.93	3.19	0.46	2290
24	22	8.03	2.73	0.34	2097	7.75	2.63	0.34	2229	7.56	2.57	0.34	2290	7.25	2.46	0.34	2386
24	24	8.44	1.86	0.22	2193	8.13	1.79	0.22	2314	7.94	1.75	0.22	2386	7.69	1.69	0.22	2506
25	18	7.40	4.59	0.62	1928	7.09	4.39	0.62	2024	6.80	4.22	0.62	2121	6.55	4.06	0.62	2217
25	20	7.72	3.86	0.50	2024	7.40	3.70	0.50	2145	7.18	3.59	0.50	2193	6.93	3.47	0.50	2290
25	22	8.03	3.05	0.38	2097	7.75	2.94	0.38	2229	7.56	2.87	0.38	2290	7.25	2.75	0.38	2386
25	24	8.44	2.19	0.26	2193	8.13	2.11	0.26	2314	7.94	2.06	0.26	2386	7.69	2.00	0.26	2506
26	18	7.40	4.89	0.66	1928	7.09	4.68	0.66	2024	6.80	4.49	0.66	2121	6.55	4.32	0.66	2217
26	20	7.72	4.17	0.54	2024	7.40	4.00	0.54	2145	7.18	3.88	0.54	2193	6.93	3.74	0.54	2290
26	22	8.03	3.37	0.42	2097	7.75	3.25	0.42	2229	7.56	3.18	0.42	2290	7.25	3.04	0.42	2386
26	24	8.44	2.53	0.30	2193	8.13	2.44	0.30	2314	7.94	2.38	0.30	2386	7.69	2.31	0.30	2506
26	26	8.69	1.56	0.18	2314	8.44	1.52	0.18	2434	8.32	1.50	0.18	2506	8.06	1.45	0.18	2579
27	18	7.40	5.18	0.70	1928	7.09	4.96	0.70	2024	6.80	4.76	0.70	2121	6.55	4.59	0.70	2217
27	20	7.72	4.48	0.58	2024	7.40	4.29	0.58	2145	7.18	4.17	0.58	2193	6.93	4.02	0.58	2290
27	22	8.03	3.69	0.46	2097	7.75	3.56	0.46	2229	7.56	3.48	0.46	2290	7.25	3.33	0.46	2386
27	24	8.44	2.87	0.34	2193	8.13	2.76	0.34	2314	7.94	2.70	0.34	2386	7.69	2.61	0.34	2506
27	26	8.69	1.91	0.22	2314	8.44	1.86	0.22	2434	8.32	1.83	0.22	2506	8.06	1.77	0.22	2579
28	18	7.40	5.48	0.74	1928	7.09	5.24	0.74	2024	6.80	5.03	0.74	2121	6.55	4.85	0.74	2217
28	20	7.72	4.78	0.62	2024	7.40	4.59	0.62	2145	7.18	4.45	0.62	2193	6.93	4.30	0.62	2290
28	22	8.03	4.02	0.50	2097	7.75	3.87	0.50	2229	7.56	3.78	0.50	2290	7.25	3.62	0.50	2386
28	24	8.44	3.21	0.38	2193	8.13	3.09	0.38	2314	7.94	3.02	0.38	2386	7.69	2.92	0.38	2506
28	26	8.69	2.26	0.26	2314	8.44	2.19	0.26	2434	8.32	2.16	0.26	2506	8.06	2.10	0.26	2579
29	18	7.40	5.77	0.78	1928	7.09	5.53	0.78	2024	6.80	5.31	0.78	2121	6.55	5.11	0.78	2217
29	20	7.72	5.09	0.66	2024	7.40	4.89	0.66	2145	7.18	4.74	0.66	2193	6.93	4.57	0.66	2290
29	22	8.03	4.34	0.54	2097	7.75	4.18	0.54	2229	7.56	4.08	0.54	2290	7.25	3.91	0.54	2386
29	24	8.44	3.55	0.42	2193	8.13	3.41	0.42	2314	7.94	3.33	0.42	2386	7.69	3.23	0.42	2506
29	26	8.69	2.61	0.30	2314	8.44	2.53	0.30	2434	8.32	2.49	0.30	2506	8.06	2.42	0.30	2579
30	18	7.40	6.07	0.82	1928	7.09	5.81	0.82	2024	6.80	5.58	0.82	2121	6.55	5.37	0.82	2217
30	20	7.72	5.40	0.70	2024	7.40	5.18	0.70	2145	7.18	5.03	0.70	2193	6.93	4.85	0.70	2290
30	22	8.03	4.66	0.58	2097	7.75	4.49	0.58	2229	7.56	4.38	0.58	2290	7.25	4.20	0.58	2386
30	24	8.44	3.88	0.46	2193	8.13	3.74	0.46	2314	7.94	3.65	0.46	2386	7.69	3.54	0.46	2506
30	26	8.69	2.96	0.34	2314	8.44	2.87	0.34	2434	8.32	2.83	0.34	2506	8.06	2.74	0.34	2579
31	18	7.40	6.37	0.86	1928	7.09	6.10	0.86	2024	6.80	5.85	0.86	2121	6.55	5.63	0.86	2217
31	20	7.72	5.71	0.74	2024	7.40	5.48	0.74	2145	7.18	5.31	0.74	2193	6.93	5.13	0.74	2290
31	22	8.03	4.98	0.62	2097	7.75	4.80	0.62	2229	7.56	4.69	0.62	2290	7.25	4.49	0.62	2386
31	24	8.44	4.22	0.50	2193	8.13	4.06	0.50	2314	7.94	3.97	0.50	2386	7.69	3.84	0.50	2506
31	26	8.69	3.30	0.38	2314	8.44	3.21	0.38	2434	8.32	3.16	0.38	2506	8.06	3.06	0.38	2579
32	18	7.40	6.66	0.90	1928	7.09	6.38	0.90	2024	6.80	6.12	0.90	2121	6.55	5.90	0.90	2217
32	20	7.72	6.02	0.78	2024	7.40	5.77	0.78	2145	7.18	5.60	0.78	2193	6.93	5.41	0.78	2290
32	22	8.03	5.30	0.66	2097	7.75	5.11	0.66	2229	7.56	4.99	0.66	2290	7.25	4.78	0.66	2386
32	24	8.44	4.56	0.54	2193	8.13	4.39	0.54	2314	7.94	4.29	0.54	2386	7.69	4.15	0.54	2506
32	26	8.69	3.65	0.42	2314	8.44	3.55	0.42	2434	8.32	3.49	0.42	2506	8.06	3.39	0.42	2579

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MSH-A24WV -E1 : MUH-A24WV -E1 (230V)

CAPACITY : 6.3(KW) SHF : 0.64 INPUT : 2410(W)

		OUTDOOR DB(℃)											
INDOOR DB(℃)	INDOOR WB(℃)	35				40				43			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	6.17	2.84	0.46	2362	5.67	2.61	0.46	2506	5.45	2.51	0.46	2555
21	20	6.49	2.21	0.34	2458	6.05	2.06	0.34	2579	5.83	1.98	0.34	2651
22	18	6.17	3.09	0.50	2362	5.67	2.84	0.50	2506	5.45	2.72	0.50	2555
22	20	6.49	2.47	0.38	2458	6.05	2.30	0.38	2579	5.83	2.21	0.38	2651
22	22	6.87	1.79	0.26	2555	6.43	1.67	0.26	2699	6.21	1.61	0.26	2747
23	18	6.17	3.33	0.54	2362	5.67	3.06	0.54	2506	5.45	2.94	0.54	2555
23	20	6.49	2.73	0.42	2458	6.05	2.54	0.42	2579	5.83	2.45	0.42	2651
23	22	6.87	2.06	0.30	2555	6.43	1.93	0.30	2699	6.21	1.86	0.30	2747
24	18	6.17	3.58	0.58	2362	5.67	3.29	0.58	2506	5.45	3.16	0.58	2555
24	20	6.49	2.98	0.46	2458	6.05	2.78	0.46	2579	5.83	2.68	0.46	2651
24	22	6.87	2.33	0.34	2555	6.43	2.18	0.34	2699	6.21	2.11	0.34	2747
24	24	7.25	1.59	0.22	2651	6.80	1.50	0.22	2772	6.62	1.46	0.22	2832
25	18	6.17	3.83	0.62	2362	5.67	3.52	0.62	2506	5.45	3.38	0.62	2555
25	20	6.49	3.24	0.50	2458	6.05	3.02	0.50	2579	5.83	2.91	0.50	2651
25	22	6.87	2.61	0.38	2555	6.43	2.44	0.38	2699	6.21	2.36	0.38	2747
25	24	7.25	1.88	0.26	2651	6.80	1.77	0.26	2772	6.62	1.72	0.26	2832
26	18	6.17	4.07	0.66	2362	5.67	3.74	0.66	2506	5.45	3.60	0.66	2555
26	20	6.49	3.50	0.54	2458	6.05	3.27	0.54	2579	5.83	3.15	0.54	2651
26	22	6.87	2.88	0.42	2555	6.43	2.70	0.42	2699	6.21	2.61	0.42	2747
26	24	7.25	2.17	0.30	2651	6.80	2.04	0.30	2772	6.62	1.98	0.30	2832
26	26	7.62	1.37	0.18	2747	7.18	1.29	0.18	2868	6.96	1.25	0.18	2928
27	18	6.17	4.32	0.70	2362	5.67	3.97	0.70	2506	5.45	3.81	0.70	2555
27	20	6.49	3.76	0.58	2458	6.05	3.51	0.58	2579	5.83	3.38	0.58	2651
27	22	6.87	3.16	0.46	2555	6.43	2.96	0.46	2699	6.21	2.85	0.46	2747
27	24	7.25	2.46	0.34	2651	6.80	2.31	0.34	2772	6.62	2.25	0.34	2832
27	26	7.62	1.68	0.22	2747	7.18	1.58	0.22	2868	6.96	1.53	0.22	2928
28	18	6.17	4.57	0.74	2362	5.67	4.20	0.74	2506	5.45	4.03	0.74	2555
28	20	6.49	4.02	0.62	2458	6.05	3.75	0.62	2579	5.83	3.61	0.62	2651
28	22	6.87	3.43	0.50	2555	6.43	3.21	0.50	2699	6.21	3.10	0.50	2747
28	24	7.25	2.75	0.38	2651	6.80	2.59	0.38	2772	6.62	2.51	0.38	2832
28	26	7.62	1.98	0.26	2747	7.18	1.87	0.26	2868	6.96	1.81	0.26	2928
29	18	6.17	4.82	0.78	2362	5.67	4.42	0.78	2506	5.45	4.25	0.78	2555
29	20	6.49	4.28	0.66	2458	6.05	3.99	0.66	2579	5.83	3.85	0.66	2651
29	22	6.87	3.71	0.54	2555	6.43	3.47	0.54	2699	6.21	3.35	0.54	2747
29	24	7.25	3.04	0.42	2651	6.80	2.86	0.42	2772	6.62	2.78	0.42	2832
29	26	7.62	2.29	0.30	2747	7.18	2.15	0.30	2868	6.96	2.09	0.30	2928
30	18	6.17	5.06	0.82	2362	5.67	4.65	0.82	2506	5.45	4.47	0.82	2555
30	20	6.49	4.54	0.70	2458	6.05	4.23	0.70	2579	5.83	4.08	0.70	2651
30	22	6.87	3.98	0.58	2555	6.43	3.73	0.58	2699	6.21	3.60	0.58	2747
30	24	7.25	3.33	0.46	2651	6.80	3.13	0.46	2772	6.62	3.04	0.46	2832
30	26	7.62	2.59	0.34	2747	7.18	2.44	0.34	2868	6.96	2.37	0.34	2928
31	18	6.17	5.31	0.86	2362	5.67	4.88	0.86	2506	5.45	4.69	0.86	2555
31	20	6.49	4.80	0.74	2458	6.05	4.48	0.74	2579	5.83	4.31	0.74	2651
31	22	6.87	4.26	0.62	2555	6.43	3.98	0.62	2699	6.21	3.85	0.62	2747
31	24	7.25	3.62	0.50	2651	6.80	3.40	0.50	2772	6.62	3.31	0.50	2832
31	26	7.62	2.90	0.38	2747	7.18	2.73	0.38	2868	6.96	2.65	0.38	2928
32	18	6.17	5.56	0.90	2362	5.67	5.10	0.90	2506	5.45	4.90	0.90	2555
32	20	6.49	5.06	0.78	2458	6.05	4.72	0.78	2579	5.83	4.55	0.78	2651
32	22	6.87	4.53	0.66	2555	6.43	4.24	0.66	2699	6.21	4.10	0.66	2747
32	24	7.25	3.91	0.54	2651	6.80	3.67	0.54	2772	6.62	3.57	0.54	2832
32	26	7.62	3.20	0.42	2747	7.18	3.02	0.42	2868	6.96	2.92	0.42	2928

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MSH-A30WV -E1 : MUH-A30WV -E1 (230V)

CAPACITY : 8.5(KW) SHF : 0.62 INPUT : 3260(W)

		OUTDOOR DB(℃)															
INDOOR	INDOOR	21				25				27				30			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	9.99	4.39	0.44	2608	9.56	4.21	0.44	2738	9.18	4.04	0.44	2869	8.84	3.89	0.44	2999
21	20	10.41	3.33	0.32	2738	9.99	3.20	0.32	2901	9.69	3.10	0.32	2967	9.35	2.99	0.32	3097
22	18	9.99	4.79	0.48	2608	9.56	4.59	0.48	2738	9.18	4.41	0.48	2869	8.84	4.24	0.48	2999
22	20	10.41	3.75	0.36	2738	9.99	3.60	0.36	2901	9.69	3.49	0.36	2967	9.35	3.37	0.36	3097
22	22	10.84	2.60	0.24	2836	10.46	2.51	0.24	3016	10.20	2.45	0.24	3097	9.78	2.35	0.24	3227
23	18	9.99	5.19	0.52	2608	9.56	4.97	0.52	2738	9.18	4.77	0.52	2869	8.84	4.60	0.52	2999
23	20	10.41	4.17	0.40	2738	9.99	4.00	0.40	2901	9.69	3.88	0.40	2967	9.35	3.74	0.40	3097
23	22	10.84	3.03	0.28	2836	10.46	2.93	0.28	3016	10.20	2.86	0.28	3097	9.78	2.74	0.28	3227
24	18	9.99	5.59	0.56	2608	9.56	5.36	0.56	2738	9.18	5.14	0.56	2869	8.84	4.95	0.56	2999
24	20	10.41	4.58	0.44	2738	9.99	4.39	0.44	2901	9.69	4.26	0.44	2967	9.35	4.11	0.44	3097
24	22	10.84	3.47	0.32	2836	10.46	3.35	0.32	3016	10.20	3.26	0.32	3097	9.78	3.13	0.32	3227
24	24	11.39	2.28	0.20	2967	10.97	2.19	0.20	3130	10.71	2.14	0.20	3227	10.37	2.07	0.20	3390
25	18	9.99	5.99	0.60	2608	9.56	5.74	0.60	2738	9.18	5.51	0.60	2869	8.84	5.30	0.60	2999
25	20	10.41	5.00	0.48	2738	9.99	4.79	0.48	2901	9.69	4.65	0.48	2967	9.35	4.49	0.48	3097
25	22	10.84	3.90	0.36	2836	10.46	3.76	0.36	3016	10.20	3.67	0.36	3097	9.78	3.52	0.36	3227
25	24	11.39	2.73	0.24	2967	10.97	2.63	0.24	3130	10.71	2.57	0.24	3227	10.37	2.49	0.24	3390
26	18	9.99	6.39	0.64	2608	9.56	6.12	0.64	2738	9.18	5.88	0.64	2869	8.84	5.66	0.64	2999
26	20	10.41	5.41	0.52	2738	9.99	5.19	0.52	2901	9.69	5.04	0.52	2967	9.35	4.86	0.52	3097
26	22	10.84	4.34	0.40	2836	10.46	4.18	0.40	3016	10.20	4.08	0.40	3097	9.78	3.91	0.40	3227
26	24	11.39	3.19	0.28	2967	10.97	3.07	0.28	3130	10.71	3.00	0.28	3227	10.37	2.90	0.28	3390
26	26	11.73	1.88	0.16	3130	11.39	1.82	0.16	3293	11.22	1.80	0.16	3390	10.88	1.74	0.16	3488
27	18	9.99	6.79	0.68	2608	9.56	6.50	0.68	2738	9.18	6.24	0.68	2869	8.84	6.01	0.68	2999
27	20	10.41	5.83	0.56	2738	9.99	5.59	0.56	2901	9.69	5.43	0.56	2967	9.35	5.24	0.56	3097
27	22	10.84	4.77	0.44	2836	10.46	4.60	0.44	3016	10.20	4.49	0.44	3097	9.78	4.30	0.44	3227
27	24	11.39	3.64	0.32	2967	10.97	3.51	0.32	3130	10.71	3.43	0.32	3227	10.37	3.32	0.32	3390
27	26	11.73	2.35	0.20	3130	11.39	2.28	0.20	3293	11.22	2.24	0.20	3390	10.88	2.18	0.20	3488
28	18	9.99	7.19	0.72	2608	9.56	6.89	0.72	2738	9.18	6.61	0.72	2869	8.84	6.36	0.72	2999
28	20	10.41	6.25	0.60	2738	9.99	5.99	0.60	2901	9.69	5.81	0.60	2967	9.35	5.61	0.60	3097
28	22	10.84	5.20	0.48	2836	10.46	5.02	0.48	3016	10.20	4.90	0.48	3097	9.78	4.69	0.48	3227
28	24	11.39	4.10	0.36	2967	10.97	3.95	0.36	3130	10.71	3.86	0.36	3227	10.37	3.73	0.36	3390
28	26	11.73	2.82	0.24	3130	11.39	2.73	0.24	3293	11.22	2.69	0.24	3390	10.88	2.61	0.24	3488
29	18	9.99	7.59	0.76	2608	9.56	7.27	0.76	2738	9.18	6.98	0.76	2869	8.84	6.72	0.76	2999
29	20	10.41	6.66	0.64	2738	9.99	6.39	0.64	2901	9.69	6.20	0.64	2967	9.35	5.98	0.64	3097
29	22	10.84	5.64	0.52	2836	10.46	5.44	0.52	3016	10.20	5.30	0.52	3097	9.78	5.08	0.52	3227
29	24	11.39	4.56	0.40	2967	10.97	4.39	0.40	3130	10.71	4.28	0.40	3227	10.37	4.15	0.40	3390
29	26	11.73	3.28	0.28	3130	11.39	3.19	0.28	3293	11.22	3.14	0.28	3390	10.88	3.05	0.28	3488
30	18	9.99	7.99	0.80	2608	9.56	7.65	0.80	2738	9.18	7.34	0.80	2869	8.84	7.07	0.80	2999
30	20	10.41	7.08	0.68	2738	9.99	6.79	0.68	2901	9.69	6.59	0.68	2967	9.35	6.36	0.68	3097
30	22	10.84	6.07	0.56	2836	10.46	5.85	0.56	3016	10.20	5.71	0.56	3097	9.78	5.47	0.56	3227
30	24	11.39	5.01	0.44	2967	10.97	4.82	0.44	3130	10.71	4.71	0.44	3227	10.37	4.56	0.44	3390
30	26	11.73	3.75	0.32	3130	11.39	3.64	0.32	3293	11.22	3.59	0.32	3390	10.88	3.48	0.32	3488
31	18	9.99	8.39	0.84	2608	9.56	8.03	0.84	2738	9.18	7.71	0.84	2869	8.84	7.43	0.84	2999
31	20	10.41	7.50	0.72	2738	9.99	7.19	0.72	2901	9.69	6.98	0.72	2967	9.35	6.73	0.72	3097
31	22	10.84	6.50	0.60	2836	10.46	6.27	0.60	3016	10.20	6.12	0.60	3097	9.78	5.87	0.60	3227
31	24	11.39	5.47	0.48	2967	10.97	5.26	0.48	3130	10.71	5.14	0.48	3227	10.37	4.98	0.48	3390
31	26	11.73	4.22	0.36	3130	11.39	4.10	0.36	3293	11.22	4.04	0.36	3390	10.88	3.92	0.36	3488
32	18	9.99	8.79	0.88	2608	9.56	8.42	0.88	2738	9.18	8.08	0.88	2869	8.84	7.78	0.88	2999
32	20	10.41	7.91	0.76	2738	9.99	7.59	0.76	2901	9.69	7.36	0.76	2967	9.35	7.11	0.76	3097
32	22	10.84	6.94	0.64	2836	10.46	6.69	0.64	3016	10.20	6.53	0.64	3097	9.78	6.26	0.64	3227
32	24	11.39	5.92	0.52	2967	10.97	5.70	0.52	3130	10.71	5.57	0.52	3227	10.37	5.39	0.52	3390
32	26	11.73	4.69	0.40	3130	11.39	4.56	0.40	3293	11.22	4.49	0.40	3390	10.88	4.35	0.40	3488

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA COOL operation

MSH-A30WV -E1 : MUH-A30WV -E1 (230V)

CAPACITY : 8.5(KW) SHF : 0.62 INPUT : 3260(W)

		OUTDOOR DB(℃)											
INDOOR DB(℃)	INDOOR WB(℃)	35				40				43			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	8.33	3.67	0.44	3195	7.65	3.37	0.44	3390	7.35	3.24	0.44	3456
21	20	8.76	2.80	0.32	3325	8.16	2.61	0.32	3488	7.86	2.52	0.32	3586
22	18	8.33	4.00	0.48	3195	7.65	3.67	0.48	3390	7.35	3.53	0.48	3456
22	20	8.76	3.15	0.36	3325	8.16	2.94	0.36	3488	7.86	2.83	0.36	3586
22	22	9.27	2.22	0.24	3456	8.67	2.08	0.24	3651	8.37	2.01	0.24	3716
23	18	8.33	4.33	0.52	3195	7.65	3.98	0.52	3390	7.35	3.82	0.52	3456
23	20	8.76	3.50	0.40	3325	8.16	3.26	0.40	3488	7.86	3.15	0.40	3586
23	22	9.27	2.59	0.28	3456	8.67	2.43	0.28	3651	8.37	2.34	0.28	3716
24	18	8.33	4.66	0.56	3195	7.65	4.28	0.56	3390	7.35	4.12	0.56	3456
24	20	8.76	3.85	0.44	3325	8.16	3.59	0.44	3488	7.86	3.46	0.44	3586
24	22	9.27	2.96	0.32	3456	8.67	2.77	0.32	3651	8.37	2.68	0.32	3716
24	24	9.78	1.96	0.20	3586	9.18	1.84	0.20	3749	8.93	1.79	0.20	3831
25	18	8.33	5.00	0.60	3195	7.65	4.59	0.60	3390	7.35	4.41	0.60	3456
25	20	8.76	4.20	0.48	3325	8.16	3.92	0.48	3488	7.86	3.77	0.48	3586
25	22	9.27	3.34	0.36	3456	8.67	3.12	0.36	3651	8.37	3.01	0.36	3716
25	24	9.78	2.35	0.24	3586	9.18	2.20	0.24	3749	8.93	2.14	0.24	3831
26	18	8.33	5.33	0.64	3195	7.65	4.90	0.64	3390	7.35	4.71	0.64	3456
26	20	8.76	4.55	0.52	3325	8.16	4.24	0.52	3488	7.86	4.09	0.52	3586
26	22	9.27	3.71	0.40	3456	8.67	3.47	0.40	3651	8.37	3.35	0.40	3716
26	24	9.78	2.74	0.28	3586	9.18	2.57	0.28	3749	8.93	2.50	0.28	3831
26	26	10.29	1.65	0.16	3716	9.69	1.55	0.16	3879	9.39	1.50	0.16	3961
27	18	8.33	5.66	0.68	3195	7.65	5.20	0.68	3390	7.35	5.00	0.68	3456
27	20	8.76	4.90	0.56	3325	8.16	4.57	0.56	3488	7.86	4.40	0.56	3586
27	22	9.27	4.08	0.44	3456	8.67	3.81	0.44	3651	8.37	3.68	0.44	3716
27	24	9.78	3.13	0.32	3586	9.18	2.94	0.32	3749	8.93	2.86	0.32	3831
27	26	10.29	2.06	0.20	3716	9.69	1.94	0.20	3879	9.39	1.88	0.20	3961
28	18	8.33	6.00	0.72	3195	7.65	5.51	0.72	3390	7.35	5.29	0.72	3456
28	20	8.76	5.25	0.60	3325	8.16	4.90	0.60	3488	7.86	4.72	0.60	3586
28	22	9.27	4.45	0.48	3456	8.67	4.16	0.48	3651	8.37	4.02	0.48	3716
28	24	9.78	3.52	0.36	3586	9.18	3.30	0.36	3749	8.93	3.21	0.36	3831
28	26	10.29	2.47	0.24	3716	9.69	2.33	0.24	3879	9.39	2.25	0.24	3961
29	18	8.33	6.33	0.76	3195	7.65	5.81	0.76	3390	7.35	5.59	0.76	3456
29	20	8.76	5.60	0.64	3325	8.16	5.22	0.64	3488	7.86	5.03	0.64	3586
29	22	9.27	4.82	0.52	3456	8.67	4.51	0.52	3651	8.37	4.35	0.52	3716
29	24	9.78	3.91	0.40	3586	9.18	3.67	0.40	3749	8.93	3.57	0.40	3831
29	26	10.29	2.88	0.28	3716	9.69	2.71	0.28	3879	9.39	2.63	0.28	3961
30	18	8.33	6.66	0.80	3195	7.65	6.12	0.80	3390	7.35	5.88	0.80	3456
30	20	8.76	5.95	0.68	3325	8.16	5.55	0.68	3488	7.86	5.35	0.68	3586
30	22	9.27	5.19	0.56	3456	8.67	4.86	0.56	3651	8.37	4.69	0.56	3716
30	24	9.78	4.30	0.44	3586	9.18	4.04	0.44	3749	8.93	3.93	0.44	3831
30	26	10.29	3.29	0.32	3716	9.69	3.10	0.32	3879	9.39	3.01	0.32	3961
31	18	8.33	7.00	0.84	3195	7.65	6.43	0.84	3390	7.35	6.18	0.84	3456
31	20	8.76	6.30	0.72	3325	8.16	5.88	0.72	3488	7.86	5.66	0.72	3586
31	22	9.27	5.56	0.60	3456	8.67	5.20	0.60	3651	8.37	5.02	0.60	3716
31	24	9.78	4.69	0.48	3586	9.18	4.41	0.48	3749	8.93	4.28	0.48	3831
31	26	10.29	3.70	0.36	3716	9.69	3.49	0.36	3879	9.39	3.38	0.36	3961
32	18	8.33	7.33	0.88	3195	7.65	6.73	0.88	3390	7.35	6.47	0.88	3456
32	20	8.76	6.65	0.76	3325	8.16	6.20	0.76	3488	7.86	5.98	0.76	3586
32	22	9.27	5.93	0.64	3456	8.67	5.55	0.64	3651	8.37	5.36	0.64	3716
32	24	9.78	5.08	0.52	3586	9.18	4.77	0.52	3749	8.93	4.64	0.52	3831
32	26	10.29	4.11	0.40	3716	9.69	3.88	0.40	3879	9.39	3.76	0.40	3961

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB : Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB : Wet-bulb temperature

PERFORMANCE DATA HEAT operation

MSH-A18WV -E1 : MUH-A18WV -E1 (230V)

CAPACITY : 5.2(KW) INPUT : 1610(W)

INDOOR DB(℃)	OUTDOOR WB(℃)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	3.28	1047	3.95	1256	4.63	1417	5.30	1530	5.98	1626	6.60	1674	7.28	1707
21	3.12	1127	3.74	1336	4.42	1481	5.04	1594	5.72	1674	6.34	1723	6.99	1787
26	2.81	1208	3.48	1417	4.11	1562	4.78	1674	5.46	1755	6.08	1803	6.76	1852

NOTE Q :Total capacity (kW) INPUT:Total power input (W) DB : Dry-bulb temperature

MSH-A24WV -E1 : MUH-A24WV -E1 (230V)

CAPACITY : 7.2(KW) INPUT : 2480(W)

INDOOR DB(℃)	OUTDOOR WB(℃)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	4.54	1612	5.47	1934	6.41	2182	7.34	2356	8.28	2505	9.14	2579	10.08	2629
21	4.32	1736	5.18	2058	6.12	2282	6.98	2455	7.92	2579	8.78	2654	9.68	2753
26	3.89	1860	4.82	2182	5.69	2406	6.62	2579	7.56	2703	8.42	2778	9.36	2852

NOTE Q :Total capacity (kW) INPUT:Total power input (W) DB : Dry-bulb temperature

MSH-A30WV -E1 : MUH-A30WV -E1 (230V)

CAPACITY : 9.4(KW) INPUT : 3430(W)

INDOOR DB(℃)	OUTDOOR WB(℃)													
	-10		-5		0		5		10		15		20	
	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT	Q	INPUT
15	5.92	2230	7.14	2675	8.37	3018	9.59	3259	10.81	3464	11.94	3567	13.16	3636
21	5.64	2401	6.77	2847	7.99	3156	9.12	3396	10.34	3567	11.47	3670	12.64	3807
26	5.08	2573	6.30	3018	7.43	3327	8.65	3567	9.87	3739	11.00	3842	12.22	3945

NOTE Q :Total capacity (kW) INPUT:Total power input (W) DB : Dry-bulb temperature

9 MICROPROCESSOR CONTROL

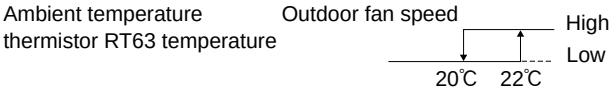
MUH-A18WV -E1 MUH-A24WV -E1 MUH-A30WV -E1

9-1. "I FEEL CONTROL" (▭) OPERATION

9-1-1. COOL mode of "I FEEL CONTROL"

1. Outdoor fan speed control <MUH-A30WV>

Outdoor fan speed is controlled according to the temperature of ambient temperature thermistor RT63.
Outdoor fan Low operation : When the outside temperature decreases to 20°C or less.
Until the outside temperature goes to 22°C.
Outdoor fan High operation : Until the outside temperature decreases to 20°C or less.
When the outside temperature goes to 22°C.



NOTE1. : If the temperature of RT63 reads from 20℃ to 22℃ at the air conditioner starting outdoor fan speed is High.
NOTE2. : When indoor fan speed is Low except HEAT operation mode and the outside temperature is 30℃ or less, the outdoor fan operates at Low.
Outdoor fan Low operation is cancelled according to the following conditions(① or ②):
① When the operation is not changed and the outside temperature goes to 33℃ or more.
② When the operation is changed. (Change to HEAT operation mode / Change of the indoor fan speed)

2. Discharge temperature protection <MUH-A30WV>

The compressor is controlled by the temperature of discharge temperature thermistor RT62 for excess rise protection of compressor discharge pressure.

• Compressor
When the temperature of discharge temperature thermistor RT62 goes to 120℃ or more, the compressor is turned OFF. After 3 minutes since the compressor has been turned OFF, if the temperature of discharge temperature thermistor RT62 becomes 100℃ or less, the compressor is turned ON.

9-1-2. DRY mode of "I FEEL CONTROL"

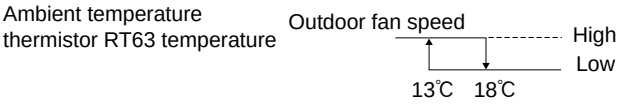
1. Outdoor fan speed control <MUH-A30WV>

Outdoor fan speed control is as same as one of COOL mode of "I FEEL CONTROL".

9-1-3. HEAT mode of "I FEEL CONTROL"

1. Outdoor fan speed control <MUH-A30WV>

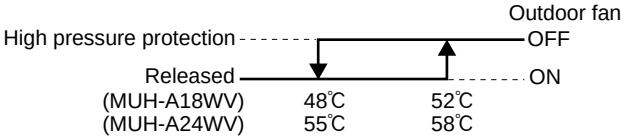
Outdoor fan speed is controlled according to the temperature of ambient temperature thermistor RT63.
Outdoor fan Low operation : Until the outside temperature decreases to 13°C.
When the outside temperature goes to 18°C or more.
Outdoor fan High operation :When the outside temperature decreases to 13°C or less.
Until the outside temperature goes to 18°C.



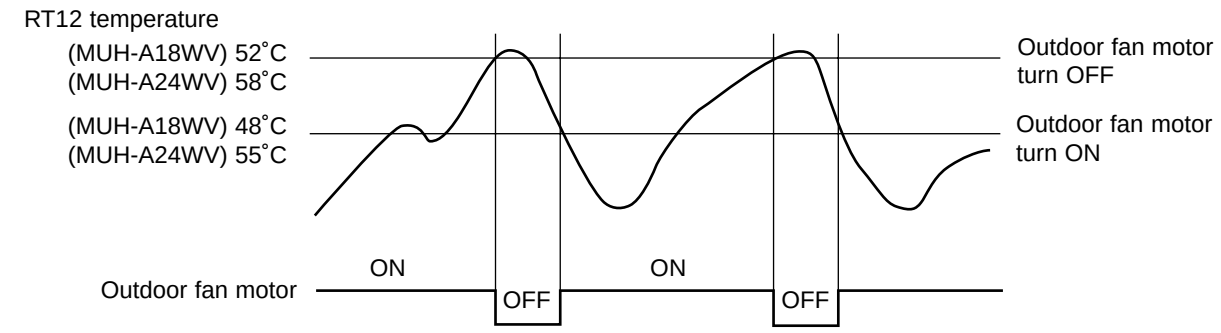
2. High pressure protection <MUH-A18/A24WV>

During heating operation, the outdoor fan motor is controlled by the temperature of indoor coil thermistor RT12 for excess rise protection of compressor discharge pressure.

(MUH-A18WV) Outdoor fan OFF : 52°C
Outdoor fan ON : 48°C
(MUH-A24WV) Outdoor fan OFF : 58°C
Outdoor fan ON : 55°C



High pressure protection chart
Example



NOTE : During high pressure protection and for 4 minutes and 15 seconds after high pressure protection, defrosting of outdoor heat exchanger is not detected by the defrost thermistor RT61.

<MUH-A30WV>

During heating operation, the outdoor fan and the compressor are controlled by the temperature of indoor coil thermistor RT12 for excess rise protection of compressor discharge pressure.

- Outdoor fan
  When the temperature of indoor coil thermistor RT12 goes to 55℃ or more, the outdoor fan is turned OFF.
  When the temperature of indoor coil thermistor RT12 becomes to 52℃ or less, the outdoor fan is turned ON.
- Compressor
  When the temperature of indoor coil thermistor RT12 goes to 75℃ or more, the compressor is turned OFF.
  3 minutes after the compressor is turned OFF and if the temperature of indoor coil thermistor RT12 becomes 75℃ or less, the compressor is turned ON.

NOTE : During the high pressure protection and for 10 seconds after high pressure protection, defrosting of outdoor heat exchanger is not detected by the defrost thermistor RT61.

3. Discharge temperature protection <MUH-A30WV>

Discharge temperature protection is as same as during COOL mode of “I FEEL CONTROL”.

4. Defrosting

Defrosting of outdoor heat exchanger is controlled by deicer P.C. board, with detection by the defrost thermistor RT61.

(1) Starting conditions of defrost

When all conditions of a) ~ c) are satisfied, the defrosting operation starts.

a) Under the heat operation, the compressor cumulative operation time exceeds 40 minutes without the defrosting operation working.

b) The defrost thermistor RT61 reads -3°C or less.

c) After releasing the high pressure protection 4 minutes and 15 seconds(MUH-18/24WV)/ 10 seconds(MUH-30WV) have elapsed.

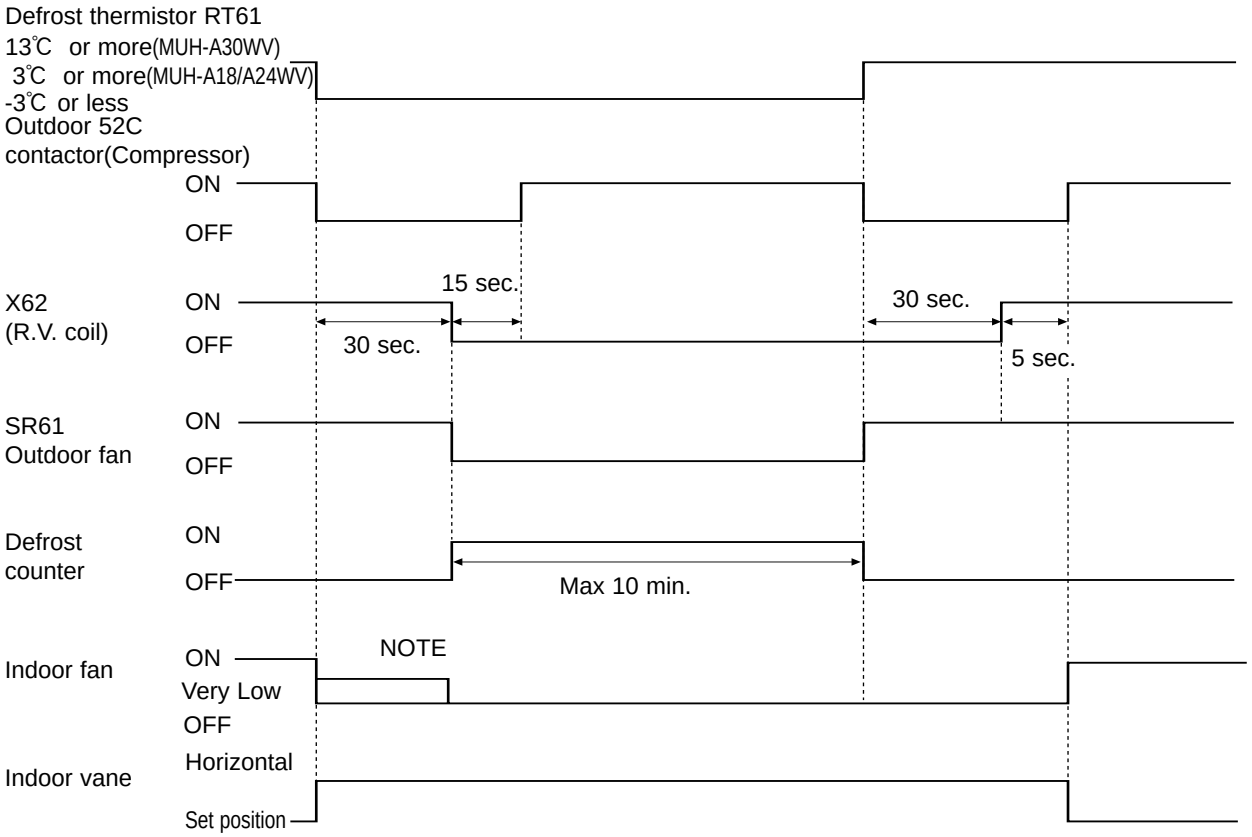
(2) Releasing conditions of defrost

When the condition d) or e) is satisfied, the defrosting operation stops.

d) The defrost thermistor RT61 reads 3°C(MUH-18/24WV)/ 13°C(MUH-30WV) or more.

e) The defrosting time exceeds 10 minutes.

(3) Defrosting time chart

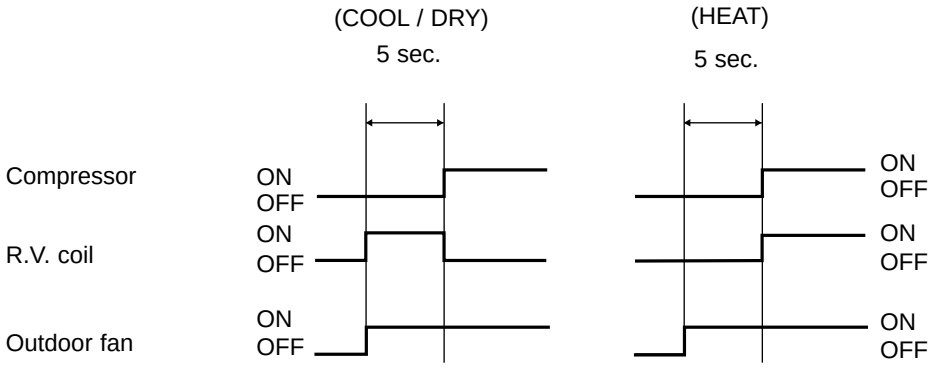


NOTE: • When the indoor coil thermistor RT12 reads above 18°C, indoor fan operates at Very Low for 30 seconds.
• When the indoor coil thermistor RT12 reads 18°C or less, the indoor fan stops.

5. R.V. coil control

Heating · · · · · ON
Cooling · · · · · OFF
Dry · · · · · · · · OFF

NOTE: The 4-way valve reverses for 5 seconds right before start-up of the compressor.



9-2. LEV control <MUH-A30WV>

LEV (Expansion valve) is controlled by “Thermostat ON” commands given from the unit.

Basic specification	Controlled range	Minimum : 54 pulse, Maximum : 500 pulse
	Drive speed	30 ~ 90 pulse / second
	Opening set	The setting is always in opening direction. (To close the LEV, it is closed to the pulse smaller than the one which is set finally. Then the LEV is opened to the final setting pulse.)
General operation	Stop of indoor unit	Opening in stop : 150 pulse → LEV opening is set to becomes 500 pulse after 3 minutes passed.
	Remote controller ON	LEV positioning (LEV is closed completely at once)
	Power ON (Breaker ON)	LEV is positioned. However, afterwards, LEV is not positioned at the first remote controller ON.
	Approximate for 2 minutes since compressor has started.	Opening is set by the initial opening. (Initial opening is set according to each operation modes and outer temperature conditions.)
	From approximate 2 minutes to approximate 13 minutes (for 11 minutes) since compressor has started.	Opening is set by standard opening. (Standard opening is set according to each operation modes and outer temperature conditions.)
	After 13 minutes passed since compressor has started.	LEV opening is corrected to be once every 2 minutes so that discharge temperature becomes the target discharge temperature. (When the discharge temperature is lower than target one : LEV is corrected in closed direction, when the discharge temperature is higher than target one : LEV is corrected in opening direction.)
	At thermostat OFF	Opening in stop : 150 pulse → LEV is set to the initial opening after about 3 minutes passed.
	At thermostat ON	Same as the starting of compressor operation
	At remote controller OFF	Opening in stop : 150 pulse → LEV is set so that the opening is opened completely at the speed of 4 pulse every 5 seconds in opening after about 3 minutes passed.

(1) LEV opening correction by discharge temperature

The LEV opening is corrected according to the temperature difference between target discharge temperature (Tb) and actual discharge temperature (Ta).

① The LEV correction is used properly for two kinds according to the LEV opening status at operation off.

Rank	Opening immediately before having stopped last time	
	100 pulse or less	100 pulse or more
Ta (℃)	Cooling / Heating	Cooling / Heating
more than Tb+10	5	20
Tb+5 to Tb+10	2	10
Tb+2 to Tb+5	1	2
Tb-2 to Tb+2	0	0
Tb-5 to Tb-2	-1	-2
Tb-10 to Tb-5	-2	-5
less than Tb-10	-5	-10

NOTE : Discharge temperature : Ta, Target discharge temperature : Tb

② When the temperature difference △RT between indoor coil thermistor (main) RT12 and indoor coil thermistor (sub) RT13 in the indoor unit is 2℃ or more for a fixed time at cool or dry operation, the target discharge temperature is changed. After the temperature is changed, when temperature difference △RT is 3℃ or more, the target temperature is changed again. The LEV opening is controlled based on the changed target discharge temperature and the temperature difference △RT.

Ta (℃)	△RT		
	less than 2℃	2℃ or more and less than 3℃	3℃ or more
more than Tb+10	20	60	60
Tb+5 to Tb+10	10	20	20
Tb+2 to Tb+5	2	2	2
Tb-2 to Tb+2	0	0	0
Tb-5 to Tb-2	-2	-2	-2
Tb-10 to Tb-5	-5	-5	-5
less than Tb-10	-10	-10	-10

NOTE : Discharge temperature : Ta, Target discharge temperature : Tb

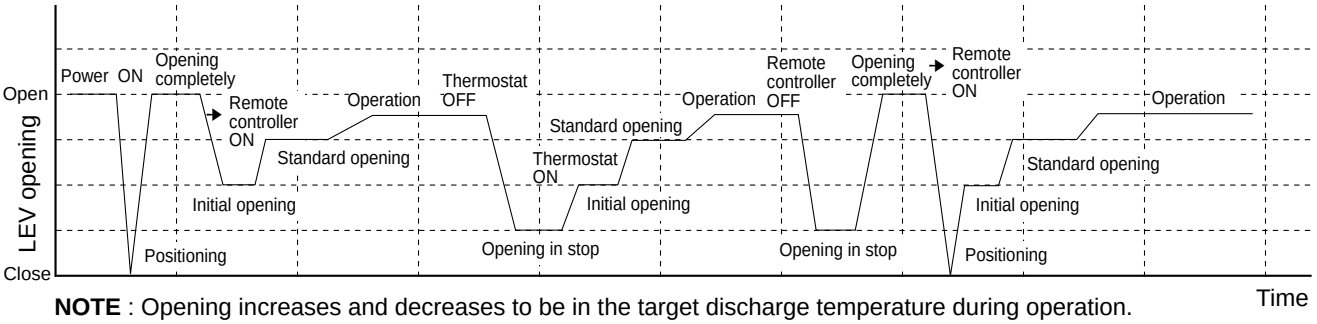
The target discharge temperature (Tb) is set according to the operation mode or the unit status as follows.

Operation mode	Tb (℃)
HEAT	85
COOL (Normal)	80
COOL (△RT is less than 2℃, or △RT is 2℃ or more and less than 3℃.)	70
COOL (△RT is 3 ℃ or more.)	65

NOTE : Target discharge temperature : Tb

NOTE : When the discharge temperature (Ta) is 50℃ or less on the cool operation, or is 49℃ or less on heat operation, LEV opening is set in 54 pulse.
When this state continues for 20 minutes, the compressor is stopped and restarts in 3 minutes.
When the compressor is stopped, the indoor unit indicates the abnormality of refrigerant system and stops.
(OPERATION INDICATOR lamp is 10-time flashing on and off.)

(2) LEV time chart



NOTE : Opening increases and decreases to be in the target discharge temperature during operation.

10 SERVICE FUNCTIONS

MUH-A18WV -E1 MUH-A24WV -E1 MUH-A30WV -E1

10-1. COMPULSORY DEFROSTING MODE FOR SERVICE

By short circuit of the connector JPDS and JPSG(MUH-A18WV)/ JPG1 and R871(MUH-A24/A30WV) on the outdoor deicer P.C. board, defrosting mode can be accomplished regardless of the defrost interval restriction. (Refer to page 37 or 38.)
Defrost thermistor RT61 must read below -3°C.

10-2. CHANGE IN DEFROST SETTING

<JRF> When the JRF wire of the deicer P.C. board is cut, the defrost interval time will be changed.
<JRG> When the JRG wire of the deicer P.C. board is cut, the defrost temperature will be changed.
(Refer to page 37 or 38.)

Model	Jumper wire	Change point
MUH-A18WV - E1 **MUH-A24WV - E1** **MUH-A30WV - E1**	JRF	Defrost interval time changes from 40 minutes to 15 minutes.
	JRG	Defrost start temperature changes from -3℃ to 0℃. (MUH-A18WV) Defrost start temperature does not change.(-3.0℃)(MUH-A24/A30WV) Defrost finish temperature changes from 3℃ to 10℃.(MUH-A18WV) Defrost finish temperature changes from 3℃ to 15℃.(MUH-A24WV) Defrost finish temperature changes from 13℃ to 15℃.(MUH-A30WV)

11 TROUBLESHOOTING

MUH-A18WV -E1 MUH-A24WV -E1 MUH-A30WV -E1

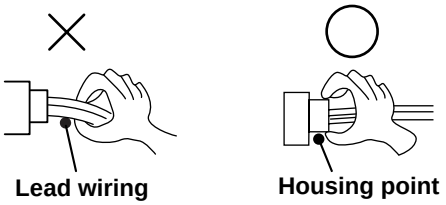
11-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

(1) Check the power supply voltage.
(2) Check the indoor/outdoor connecting wire for mis-wiring.

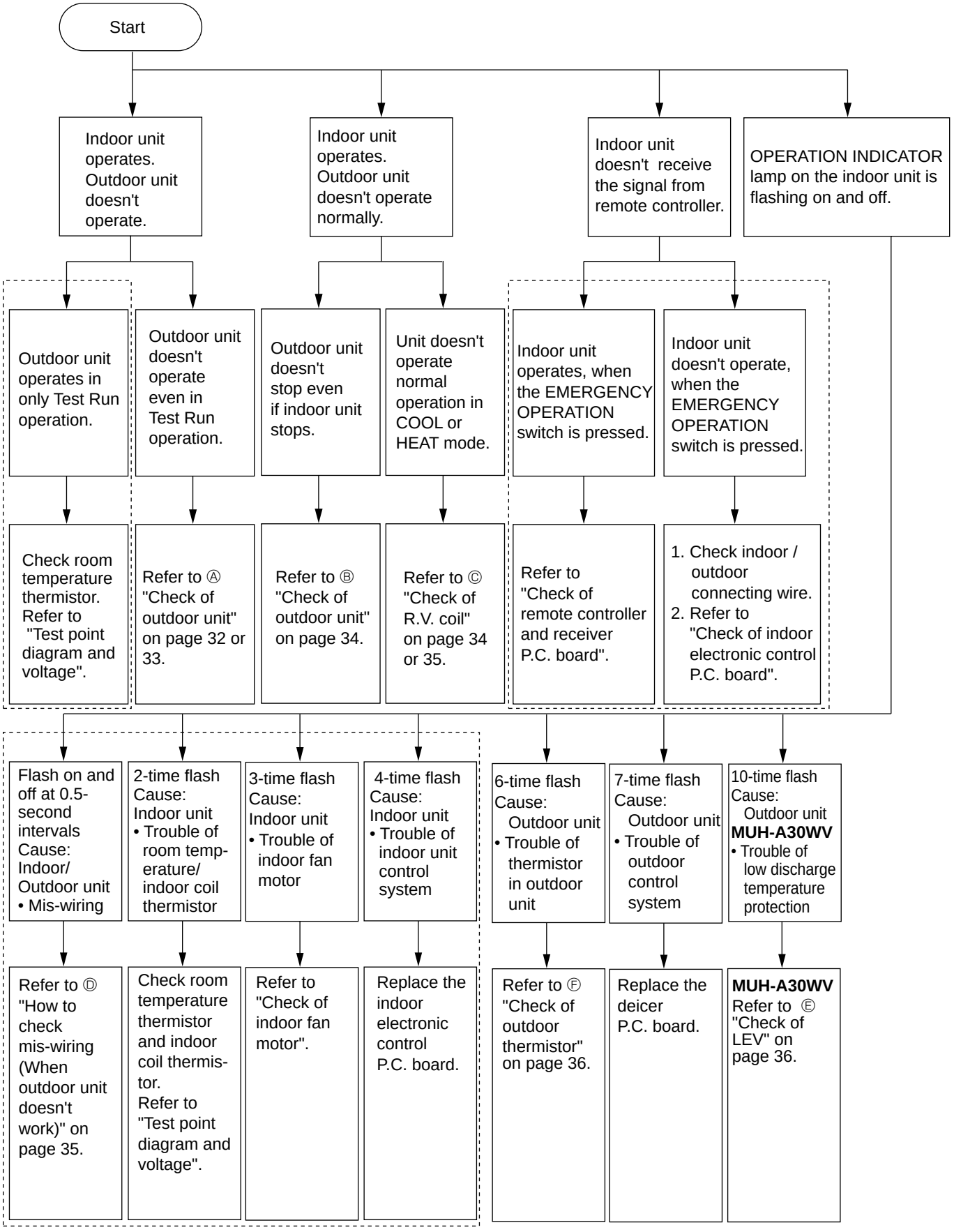
2. Take care the following during servicing.

(1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the main unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
(2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel, and the electronic control P.C. board.
(3) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
(4) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



3. Troubleshooting procedure

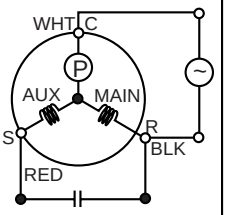
(1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.
(2) Before servicing check that the connector and terminal are connected properly.
(3) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discolouration.
(4) When troubleshooting, refer to the flow chart on page 30.


Start
Indoor unit operates. Outdoor unit doesn't operate.
Indoor unit operates. Outdoor unit doesn't operate normally.
Indoor unit doesn't receive the signal from remote controller.
OPERATION INDICATOR lamp on the indoor unit is flashing on and off.
Outdoor unit operates in only Test Run operation.
Outdoor unit doesn't operate even in Test Run operation.
Outdoor unit doesn't stop even if indoor unit stops.
Unit doesn't operate normal operation in COOL or HEAT mode.
Indoor unit operates, when the EMERGENCY OPERATION switch is pressed.
Indoor unit doesn't operate, when the EMERGENCY OPERATION switch is pressed.
Check room temperature thermistor. Refer to "Test point diagram and voltage".
Refer to Ⓐ "Check of outdoor unit" on page 32 or 33.
Refer to Ⓑ "Check of outdoor unit" on page 34.
Refer to Ⓒ "Check of R.V. coil" on page 34 or 35.
Refer to "Check of remote controller and receiver P.C. board".
1. Check indoor / outdoor connecting wire.
2. Refer to "Check of indoor electronic control P.C. board".
Flash on and off at 0.5-second intervals
Cause:
Indoor/ Outdoor unit
• Mis-wiring
2-time flash
Cause:
Indoor unit
• Trouble of room temperature/ indoor coil thermistor
3-time flash
Cause:
Indoor unit
• Trouble of indoor fan motor
4-time flash
Cause:
Indoor unit
• Trouble of indoor unit control system
6-time flash
Cause:
Outdoor unit
• Trouble of thermistor in outdoor unit
7-time flash
Cause:
Outdoor unit
• Trouble of outdoor control system
10-time flash
Cause:
Outdoor unit
MUH-A30WV
• Trouble of low discharge temperature protection
Refer to Ⓓ "How to check mis-wiring (When outdoor unit doesn't work)" on page 35.
Check room temperature thermistor and indoor coil thermistor. Refer to "Test point diagram and voltage".
Refer to "Check of indoor fan motor".
Replace the indoor electronic control P.C. board.
Refer to Ⓕ "Check of outdoor thermistor" on page 36.
Replace the deicer P.C. board.
MUH-A30WV
Refer to Ⓔ "Check of LEV" on page 36.

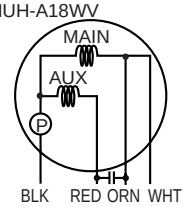
As for indoor unit, refer to service manual OB321.

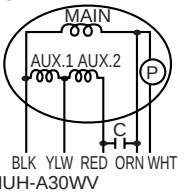
11-2. Trouble criterion of main parts

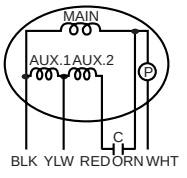
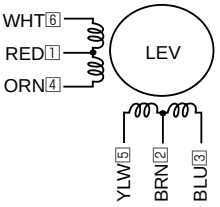
MUH-A18WV -E1 MUH-A24WV -E1 MUH-A30WV -E1

<table>
<tr><th>Part name</th><th>Check method and criterion</th><th>Figure</th></tr>
<tr><td>Defrost thermistor
(RT61)</td><td>Measure the resistance with a tester.
(Part temperature –10˚C ~ 40˚C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>5 kΩ ~ 60 kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Discharge temperature thermistor(RT62)
MUH-A30WV</td><td>Measure the resistance with a tester.
Before measurement, hold the thermistor with your hands to warm it up.
(Part temperature 0˚C ~ 40˚C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>120 kΩ ~ 800kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Ambient temperature thermistor(RT63)
MUH-A30WV</td><td>Measure the resistance with a tester.
(Part temperature –10˚C ~ 40˚C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>5 kΩ ~ 60 kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Compressor
(MC)
INNER
PROTECTOR
160± 5℃ OPEN
90±10℃ CLOSE</td><td>Measure the resistance between the terminals with a tester.
(Part temperature –10˚C ~ 40˚C)<table><tr><th rowspan="2">Terminal</th><th colspan="3">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th>MUH-A18WV</th><th>MUH-A24WV</th><th>MUH-A30WV</th></tr><tr><td>C – R</td><td>1.59 Ω ~ 1.95 Ω</td><td>0.71 Ω ~ 0.87 Ω</td><td>0.56 Ω ~ 0.71 Ω</td><td>Open or short-circuit</td></tr><tr><td>C – S</td><td>2.65 Ω ~ 3.24 Ω</td><td>1.45 Ω ~ 1.77 Ω</td><td>1.43 Ω ~ 1.76 Ω</td><td></td></tr></table></td><td> 
</td></tr>
<tr><td>Outdoor fan motor(MF)

MUH-A18/A24WV
INNER
PROTECTOR
145± 8℃ OPEN
(88±15℃ CLOSE※)

MUH-A30WV
INNER
PROTECTOR
135± 5℃ OPEN
(83±15℃ CLOSE※)</td><td>Measure the resistance between the terminals with a tester.
(Part temperature –10˚C ~ 40˚C)<table><tr><th rowspan="2">Color of lead wire</th><th colspan="3">Normal</th><th>Abnormal</th></tr><tr><th>MUH-A18WV</th><th>MUH-A24WV</th><th>MUH-A30WV</th><th></th></tr><tr><td>WHT – BLK</td><td>102 Ω ~ 126 Ω</td><td>55 Ω ~ 68 Ω</td><td>55.4 Ω ~ 67.7 Ω</td><td rowspan="4">Open or short-circuit</td></tr><tr><td>BLK – RED</td><td>97 Ω ~ 120 Ω</td><td>–</td><td>–</td></tr><tr><td>BLK – YLW</td><td>–</td><td>26 Ω ~ 33 Ω</td><td>49.3 Ω ~ 60.3 Ω</td></tr><tr><td>YLW – RED</td><td>–</td><td>55 Ω ~ 68 Ω</td><td>22.9 Ω ~ 28.0 Ω</td></tr></table></td><td>MUH-A18WV
 

MUH-A24WV
 

MUH-A30WV
 
</td></tr>
<tr><td>R.V. coil(21S4)</td><td>Measure the resistance between the terminals with a tester.
(Part temperature –10˚C ~ 40˚C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>2.673 kΩ ~ 3.268 kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>LEV(Expansion valve)
MUH-A30WV</td><td>Measure the resistance with a tester.
(Part temperature : –10˚C ~ 40˚C)<table><tr><th>Color of lead wire</th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT – RED</td><td rowspan="4">30.3 Ω ~ 37.0 Ω</td><td rowspan="4">Open or short-circuit</td></tr><tr><td>RED – ORN</td></tr><tr><td>YLW – BRN</td></tr><tr><td>BRN – BLU</td></tr></table></td><td> 
</td></tr>
</table>

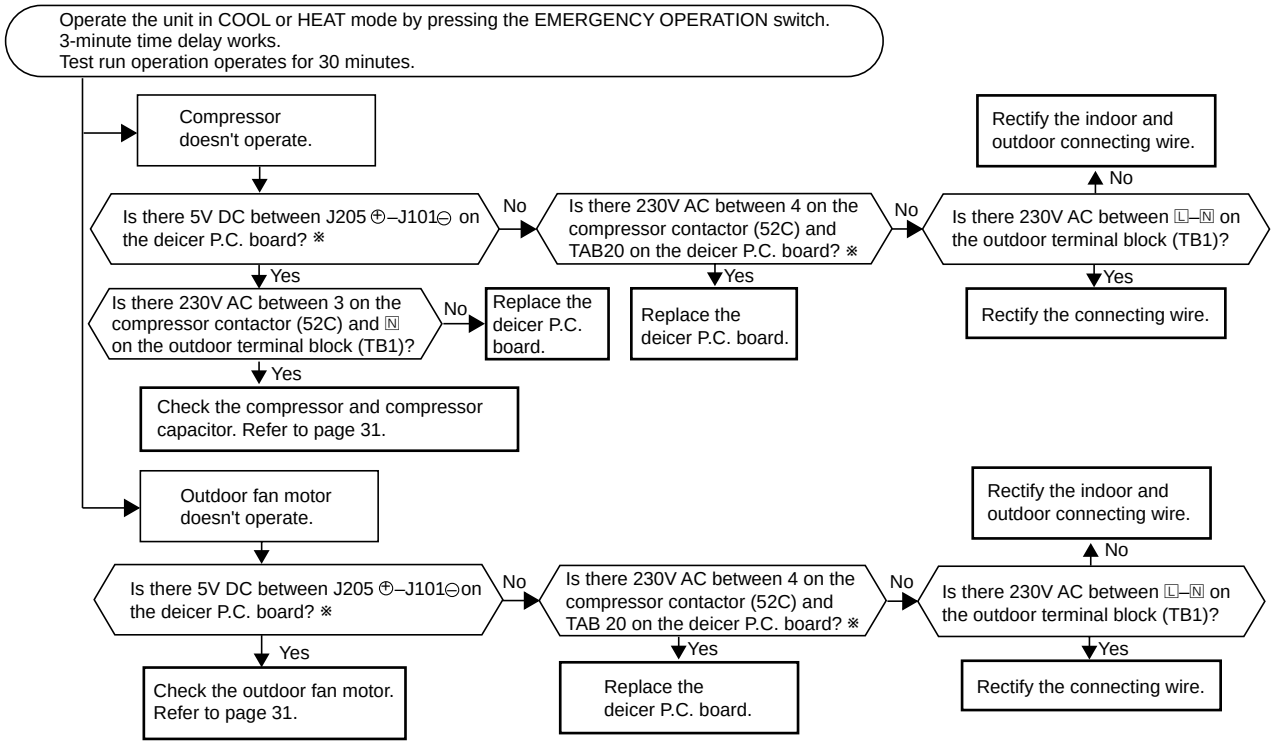
※ Reference value

Ⓟ:INNER PROTECTOR

Compressor and/or outdoor fan motor doesn't operate.

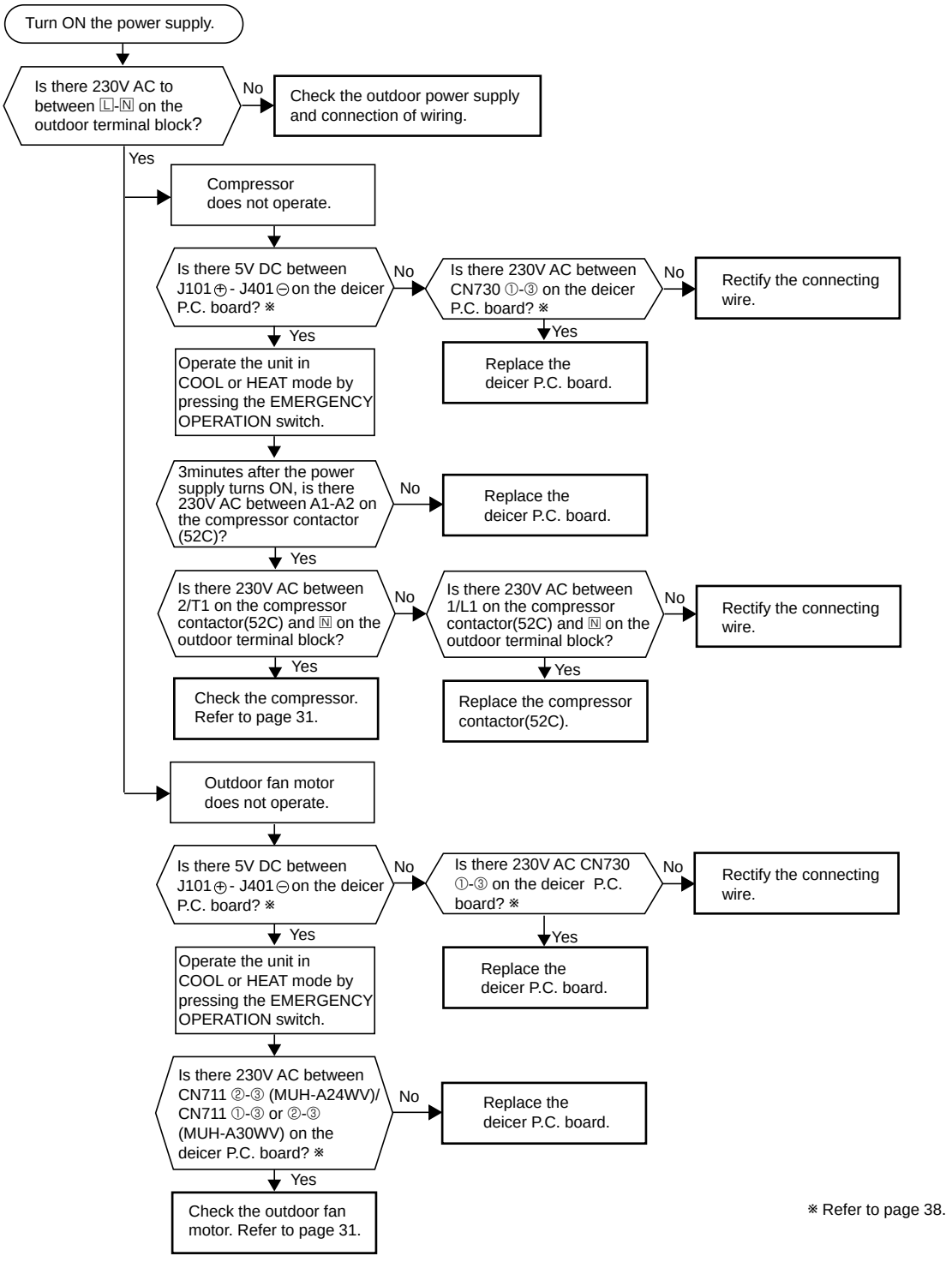
Ⓐ Check of outdoor unit

MUH-A18WV


Operate the unit in COOL or HEAT mode by pressing the EMERGENCY OPERATION switch.
3-minute time delay works.
Test run operation operates for 30 minutes.
Compressor doesn't operate.
Is there 5V DC between J205 ⊕–J101⊖ on the deicer P.C. board? ※
No
Is there 230V AC between 4 on the compressor contactor (52C) and TAB20 on the deicer P.C. board? ※
No
Is there 230V AC between L–N on the outdoor terminal block (TB1)?
No
Rectify the indoor and outdoor connecting wire.
Yes
Rectify the connecting wire.
Yes
Replace the deicer P.C. board.
Yes
Is there 230V AC between 3 on the compressor contactor (52C) and N on the outdoor terminal block (TB1)?
No
Replace the deicer P.C. board.
Yes
Check the compressor and compressor capacitor. Refer to page 31.
Outdoor fan motor doesn't operate.
Is there 5V DC between J205 ⊕–J101⊖ on the deicer P.C. board? ※
No
Is there 230V AC between 4 on the compressor contactor (52C) and TAB 20 on the deicer P.C. board? ※
No
Is there 230V AC between L–N on the outdoor terminal block (TB1)?
No
Rectify the indoor and outdoor connecting wire.
Yes
Rectify the connecting wire.
Yes
Replace the deicer P.C. board.
Yes
Check the outdoor fan motor. Refer to page 31.

※ Refer to page 37.

MUH-A24WV
MUH-A30WV

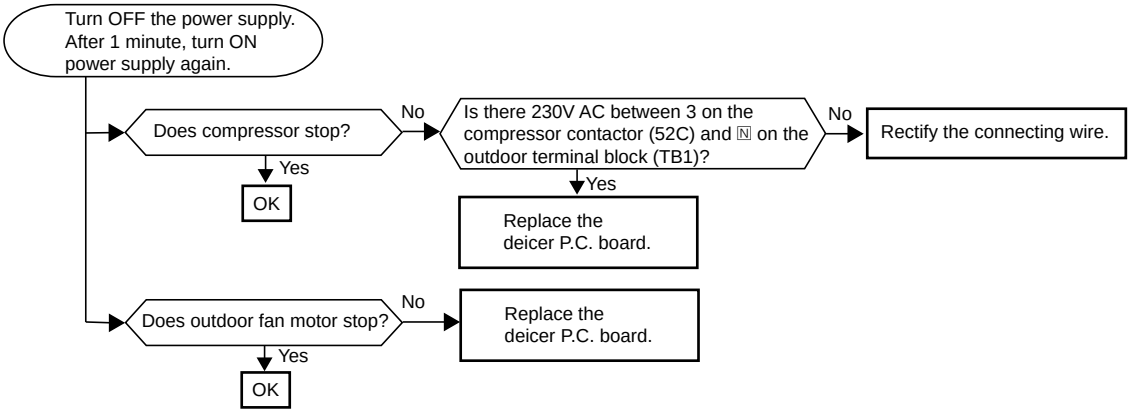

Turn ON the power supply.
Is there 230V AC to between L-N on the outdoor terminal block?
No
Check the outdoor power supply and connection of wiring.
Yes
Compressor does not operate.
Is there 5V DC between J101⊕ - J401⊖ on the deicer P.C. board? ※
No
Is there 230V AC between CN730 ①-③ on the deicer P.C. board? ※
No
Rectify the connecting wire.
Yes
Replace the deicer P.C. board.
Yes
Operate the unit in COOL or HEAT mode by pressing the EMERGENCY OPERATION switch.
3minutes after the power supply turns ON, is there 230V AC between A1-A2 on the compressor contactor (52C)?
No
Replace the deicer P.C. board.
Yes
Is there 230V AC between 2/T1 on the compressor contactor(52C) and N on the outdoor terminal block?
No
Is there 230V AC between 1/L1 on the compressor contactor(52C) and N on the outdoor terminal block?
No
Rectify the connecting wire.
Yes
Check the compressor. Refer to page 31.
Yes
Replace the compressor contactor(52C).
Outdoor fan motor does not operate.
Is there 5V DC between J101⊕ - J401⊖ on the deicer P.C. board? ※
No
Is there 230V AC CN730 ①-③ on the deicer P.C. board? ※
No
Rectify the connecting wire.
Yes
Replace the deicer P.C. board.
Yes
Operate the unit in COOL or HEAT mode by pressing the EMERGENCY OPERATION switch.
Is there 230V AC between CN711 ②-③ (MUH-A24WV)/ CN711 ①-③ or ②-③ (MUH-A30WV) on the deicer P.C. board? ※
No
Replace the deicer P.C. board.
Yes
Check the outdoor fan motor. Refer to page 31.

※ Refer to page 38.

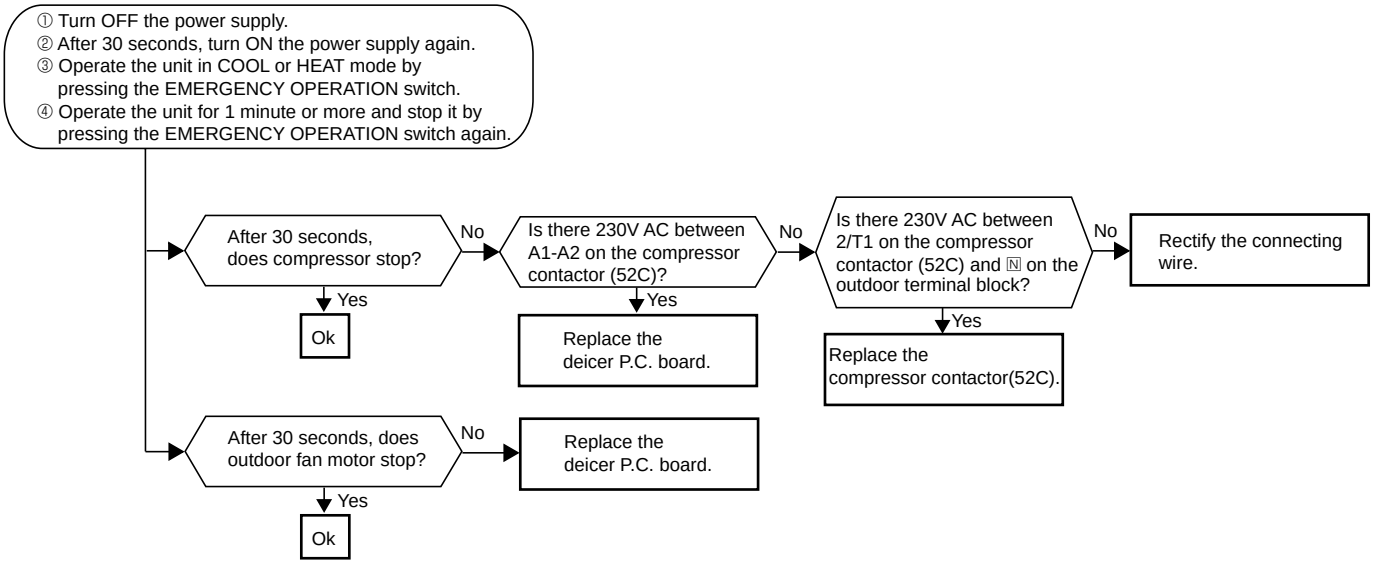
Compressor and/or outdoor fan motor doesn't stop.

Ⓑ Check of outdoor unit

MUH-A18WV



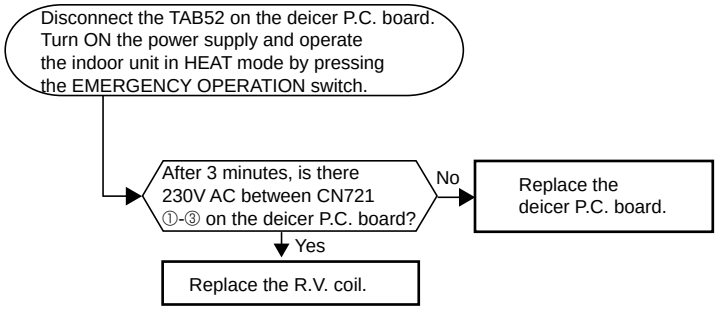
MUH-A24WV
MUH-A30WV


① Turn OFF the power supply.
② After 30 seconds, turn ON the power supply again.
③ Operate the unit in COOL or HEAT mode by pressing the EMERGENCY OPERATION switch.
④ Operate the unit for 1 minute or more and stop it by pressing the EMERGENCY OPERATION switch again.
After 30 seconds, does compressor stop?
No
Is there 230V AC between A1-A2 on the compressor contactor (52C)?
No
Is there 230V AC between 2/T1 on the compressor contactor (52C) and N on the outdoor terminal block?
No
Rectify the connecting wire.
Yes
Ok
Yes
Replace the deicer P.C. board.
Yes
Replace the compressor contactor(52C).
After 30 seconds, does outdoor fan motor stop?
No
Replace the deicer P.C. board.
Yes
Ok

Unit operates COOL mode even if it is set to HEAT mode.

ⓒCheck of R.V. coil

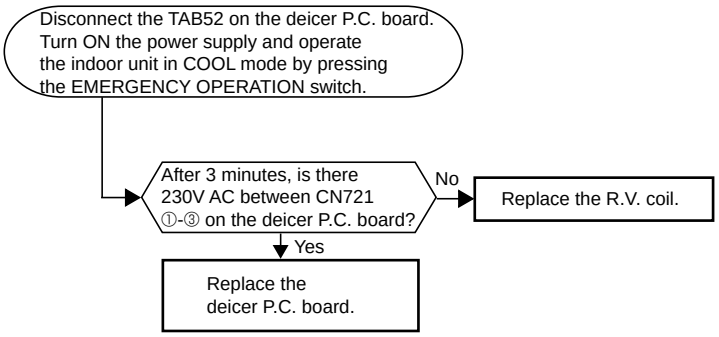
※ First, measure the resistance of R.V. coil to confirm it is disconnected or is not short-circuit.


Disconnect the TAB52 on the deicer P.C. board.
Turn ON the power supply and operate the indoor unit in HEAT mode by pressing the EMERGENCY OPERATION switch.
After 3 minutes, is there 230V AC between CN721 ①-③ on the deicer P.C. board?
No
Replace the deicer P.C. board.
Yes
Replace the R.V. coil.

Unit operates HEAT mode even if it is set to COOL mode.

ⓒCheck of R.V. coil

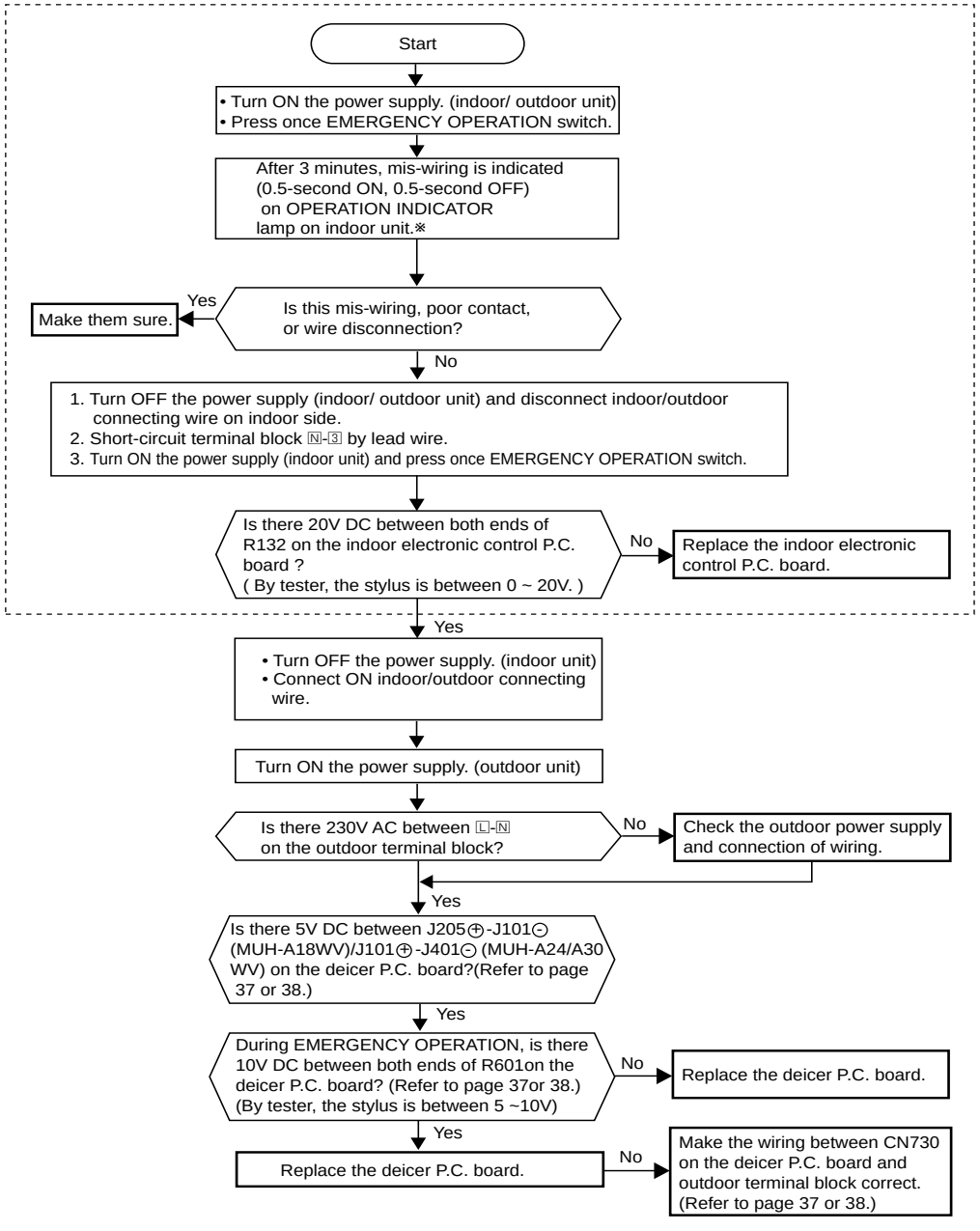
※ First, measure the resistance of R.V. coil to confirm it is disconnected or is not short-circuit.


Disconnect the TAB52 on the deicer P.C. board.
Turn ON the power supply and operate the indoor unit in COOL mode by pressing the EMERGENCY OPERATION switch.
After 3 minutes, is there 230V AC between CN721 ①-③ on the deicer P.C. board?
No
Replace the R.V. coil.
Yes
Replace the deicer P.C. board.

When OPERATION INDICATOR lamp flashes ON and OFF in every 0.5-second.
Outdoor unit doesn't operate.

ⒹHow to check mis-wiring

※ Short circuit of JPG and JPS on the indoor electronic control P.C. board enables self -check to be displayed in 3 seconds.


Start
• Turn ON the power supply. (indoor/ outdoor unit)
• Press once EMERGENCY OPERATION switch.
After 3 minutes, mis-wiring is indicated (0.5-second ON, 0.5-second OFF) on OPERATION INDICATOR lamp on indoor unit.※
Is this mis-wiring, poor contact, or wire disconnection?
Yes
Make them sure.
No
1. Turn OFF the power supply (indoor/ outdoor unit) and disconnect indoor/outdoor connecting wire on indoor side.
2. Short-circuit terminal block N-3 by lead wire.
3. Turn ON the power supply (indoor unit) and press once EMERGENCY OPERATION switch.
Is there 20V DC between both ends of R132 on the indoor electronic control P.C. board ? (By tester, the stylus is between 0 ~ 20V.)
No
Replace the indoor electronic control P.C. board.
Yes
• Turn OFF the power supply. (indoor unit)
• Connect ON indoor/outdoor connecting wire.
Turn ON the power supply. (outdoor unit)
Is there 230V AC between L-N on the outdoor terminal block?
No
Check the outdoor power supply and connection of wiring.
Yes
Is there 5V DC between J205⊕-J101⊖ (MUH-A18WV)/J101⊕-J401⊖ (MUH-A24/A30 WV) on the deicer P.C. board?(Refer to page 37 or 38.)
Yes
During EMERGENCY OPERATION, is there 10V DC between both ends of R601on the deicer P.C. board? (Refer to page 37or 38.) (By tester, the stylus is between 5 ~10V)
No
Replace the deicer P.C. board.
Yes
Replace the deicer P.C. board.
No
Make the wiring between CN730 on the deicer P.C. board and outdoor terminal block correct. (Refer to page 37 or 38.)

As for indoor unit, refer to service manual OB321.

When OPERATION INDICATOR lamp flashes 10-time.
Heating/ Cooling doesn't operate.

Ⓔ Check of LEV (Expansion valve) MUH-A30WV

① During pressing OPERATION SELECT button on remote controller, press RESET button.
② First, release RESET button.
(Confirm all displays of remote controller.)
③ Then release OPERATION SELECT button.

With remote controller set toward the indoor unit, press OPERATE/ STOP(ON/ OFF) button and confirm one beep tone.

LEV operates in full-opening direction.

Do you hear LEV "click, click·····"?
Do you touch LEV and feel it vibrate?
Yes → Ok

No

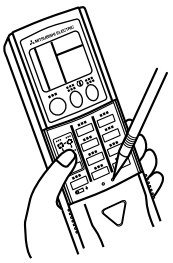
Is LEV coil properly fixed to the body?
No → Properly fix LEV coil to the body.

Yes

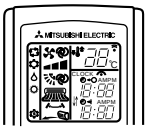
Does the resistance of LEV coil have the characterictics?
Yes → Replace the deicer P.C. board.

No

Replace the LEV coil.



① During pressing OPERATION SELECT button on remote controller, press RESET button.
② First, release RESET button.



(Confirm all displays of remote controller.)
③ Then release OPERATION SELECT button.

Characteristics of LEV coil

LEV (CN724)	Resistance
WHT–RED	30.3 Ω ~ 37.0 Ω
RED–ORN	
YLW–BRN	
BRN–BLU	

NOTE : After check of LEV, do the undermentioned operations.
1. Turn OFF the power supply of the unit and turn ON again.
2. Press the RESET button on the remote controller.

When OPERATION INDICATOR lamp flashes 6-time.
Thermistors in the outdoor unit are abnormal.

Ⓕ Check of outdoor thermistor

※ Disconnect the connectors CN661 and/ or CN662 from the deicer P.C. board.
(Check the characteristics of each thermistor.)

Turn OFF the power supply.

Defrost thermistor(RT61)
Measure resistance between CN 661 ① and ②.

<MUH-A30WV>
Discharge temperature thermistor(RT62)
Measure resistance between CN 662 ① and ②.

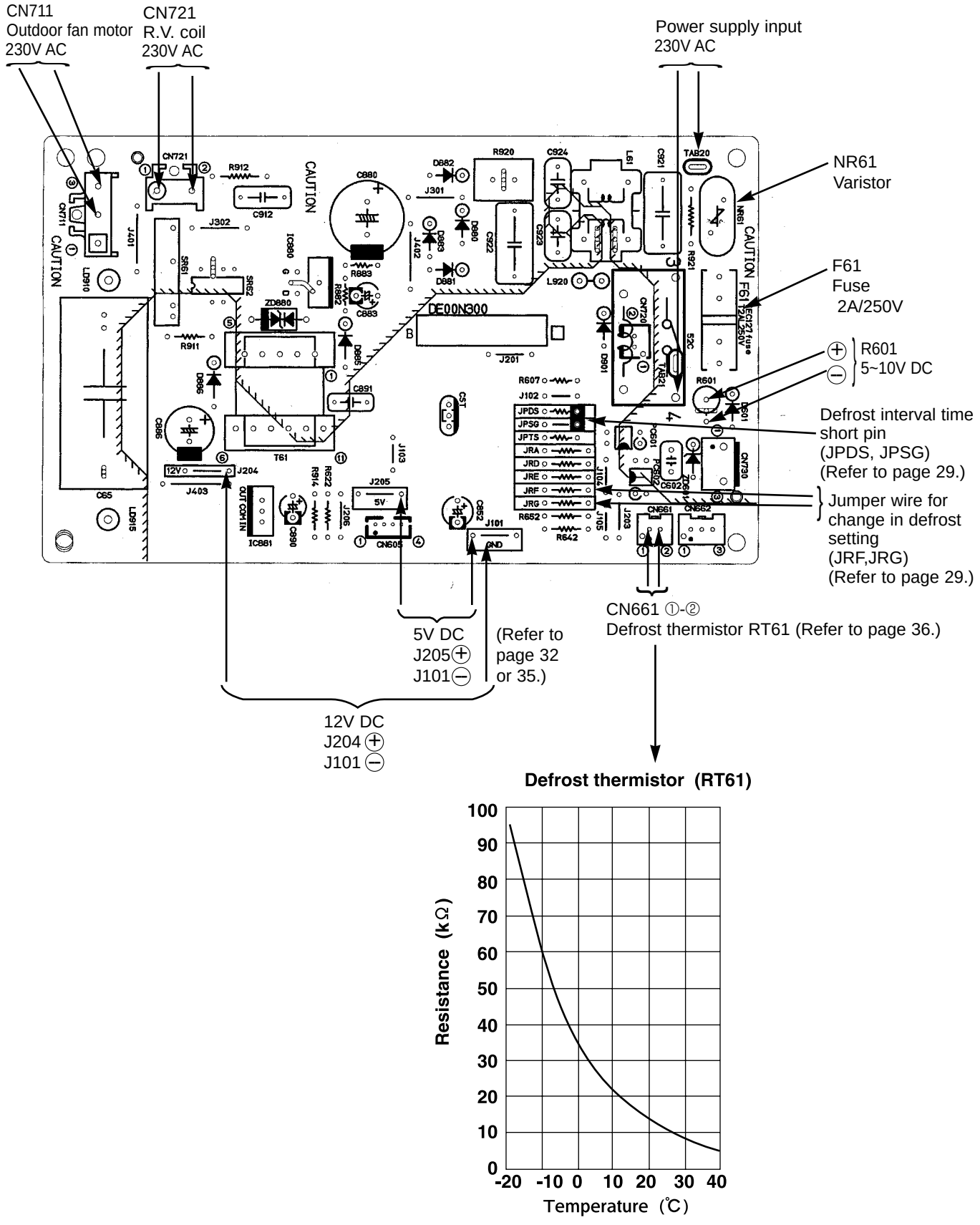
<MUH-A30WV>
Ambient temperature thermistor(RT63)
Measure resistance between CN 662 ③ and ④.

Does the resistancs of thermistor have the characteristics on page 37 or 38?
No → Replace the thermistor.
Yes → Connect CN661 and CN662. Turn ON the power supply and press the EMERGENCY OPERATION switch.

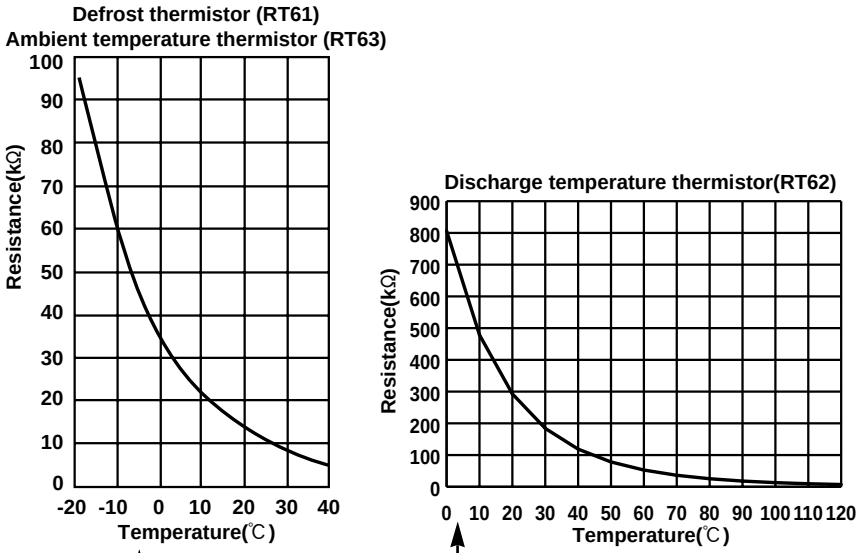
Does the unit operate 10 minutes or more?
No → Replace the deicer P.C. board.
Yes → Ok ※.

※ It is thought defective contact of the connector.

MUH-A18WV -E1
Outdoor deicer P.C. board



MUH-A24WV -E1
MUH-A30WV -E1
Outdoor deicer P.C. board



CN661 ①-②
Defrost thermistor (RT61)
(Refer to page 36.)

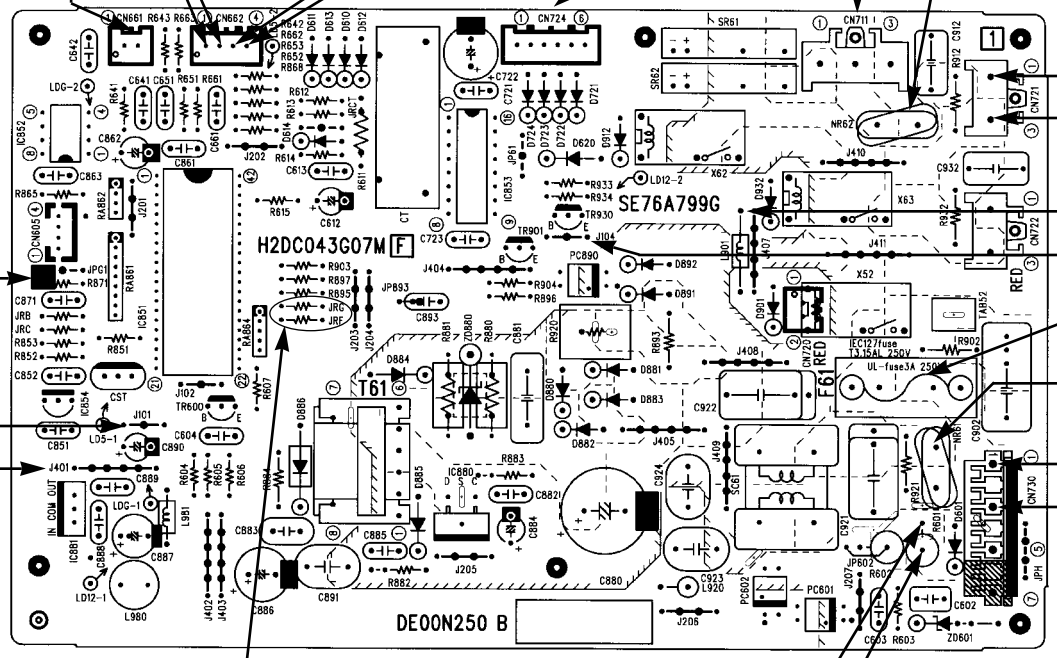
<MUH-A30WV>
CN662 ①-②
Discharge temperature thermistor (RT62)
(Refer to page 36.)

CN662 ③-④
<MUH-A30WV>
Ambient temperature thermistor (RT63)
(Refer to page 36.)

<MUH-A30WV>
LEV connector (CN724)

Fan motor connector (CN711)

Varistor (NR62)



R.V. coil (CN721)

12V DC

Fuse 3.15A / 250V

Varistor (NR61)

CN730①-③
230V AC
(Refer to page 33 or 35.)

Defrost interval time short pin(JPG1, R871)
(Refer to page 29.)

J101 ⊕
5V DC
J401 ⊖
(Refer to page 33 or 35.)

Jumper wire for change in defrost setting (JRF, JRG)
(Refer to page 29.)

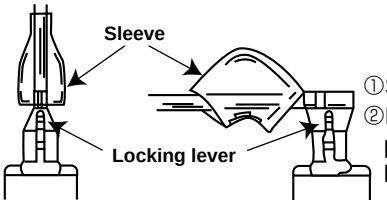
R601 10V DC
(Refer to page 35.)

12 DISASSEMBLY INSTRUCTIONS

<"Terminal with lock mechanism" Detaching points>

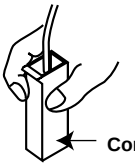
In case of terminal with lock mechanism, detach the terminal as shown below.
There are two types (Refer to (1) and (2)) of the terminal with lock mechanism.
The terminal with no lock mechanism can be removed by pulling it out.
Check the shape of the terminal and work.

(1) Slide the sleeve and check if there is a locking lever or not.



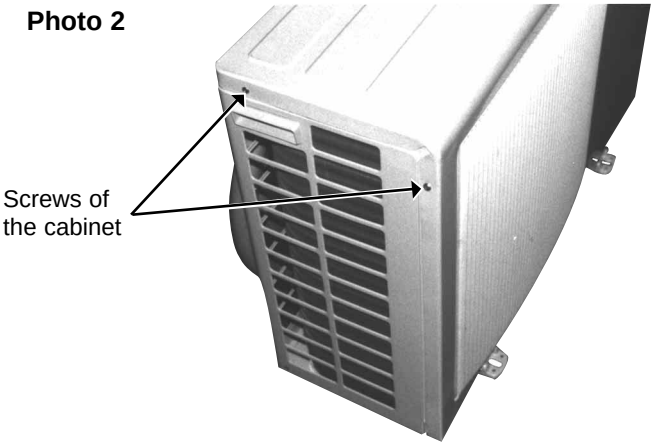
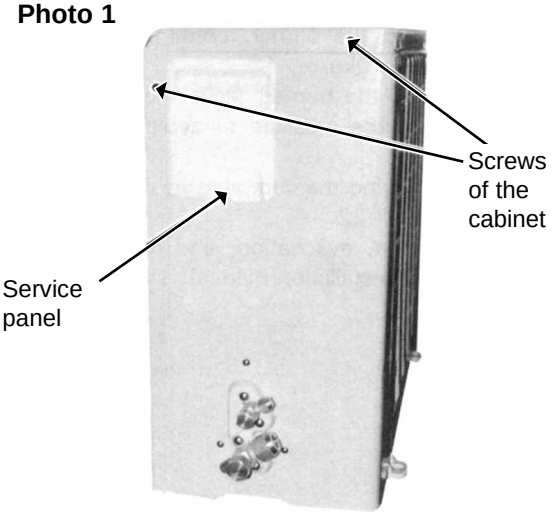
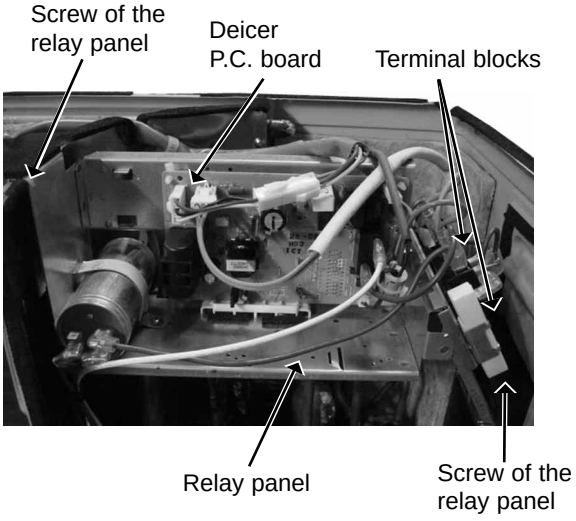
①Slide the sleeve.
②Pull the terminal while pushing the locking lever.

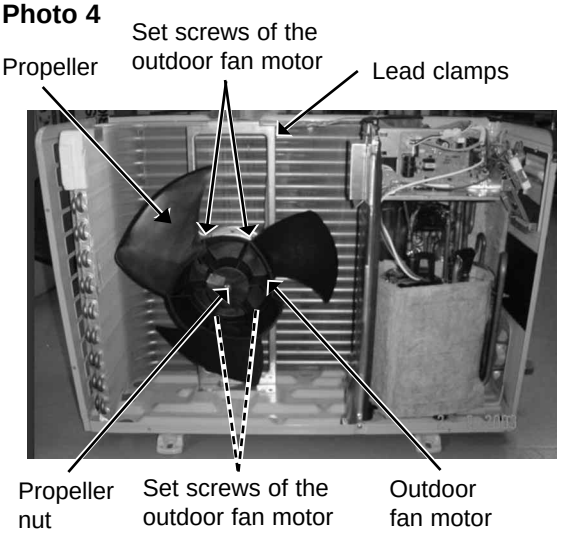
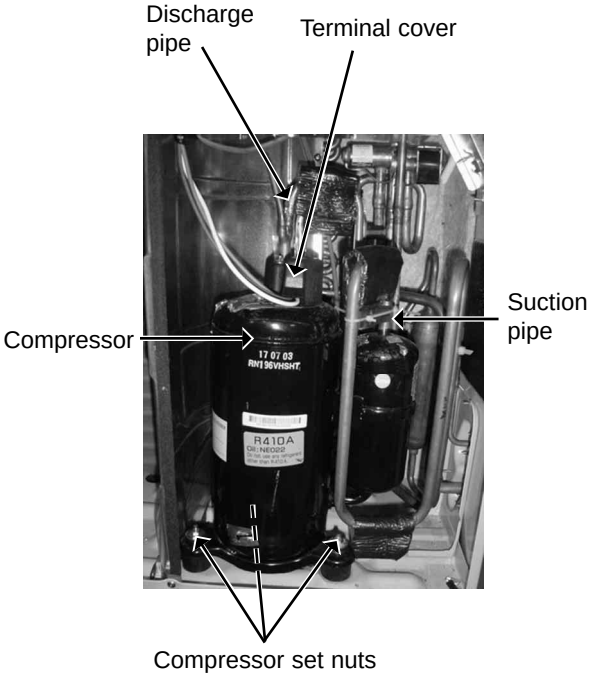
(2) The terminal with this connector is a terminal with lock mechanism



①Hold the sleeve, and pull out the terminal slowly.

12-1. MUH-A18WV -E1 OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the cabinet. (2) Hold the down of the cabinet on the both side and remove the cabinet. **Photo 2**  	**Photo 1** 
2. Removing the deicer P.C. board (1) Remove the service panel and the cabinet. (2) Disconnect all the connectors and the terminals on the deicer P.C. board. (3) Remove the deicer P.C. board.	**Photo 3** 

OPERATING PROCEDURE	PHOTOS
3. Removing the propeller and the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Remove the propeller nut and the propeller. **NOTE : Loose the propeller in the rotating direction for removal.** When attaching the propeller, align the mark on the propeller and the motor shaft cut section. Set the propeller fan in position by using the cut on the shaft and the mark on the propeller. (3) Remove the clamp of outdoor fan motor lead wire and disconnect the outdoor fan motor connector. (4) Remove the screws fixing the outdoor fan motor. (5) Remove the outdoor fan motor.	**Photo 4** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the relay panel. (3) Remove the soundproof felt. (4) Remove the terminal cover on the compressor. (5) Disconnect lead wires from the compressor. (6) Recover gas from the refrigerant circuit. (7) Disconnect the welded part of the discharge pipe. (8) Disconnect the welded part of the suction pipe. (9) Remove nuts fixing the compressor. (10) Remove the compressor. **NOTE** ● Before using a burner, reclaim gas from the pipes until the pressure gauge shows 0 kg/cm^2 (0 MPa). ● Use the burner under the condition that gas can be recovered even when the inner pressure rises by heat.	**Photo 5** 

12-2. MUH-A24WV -E1 MUH-A30WV -E1 OUTDOOR UNIT

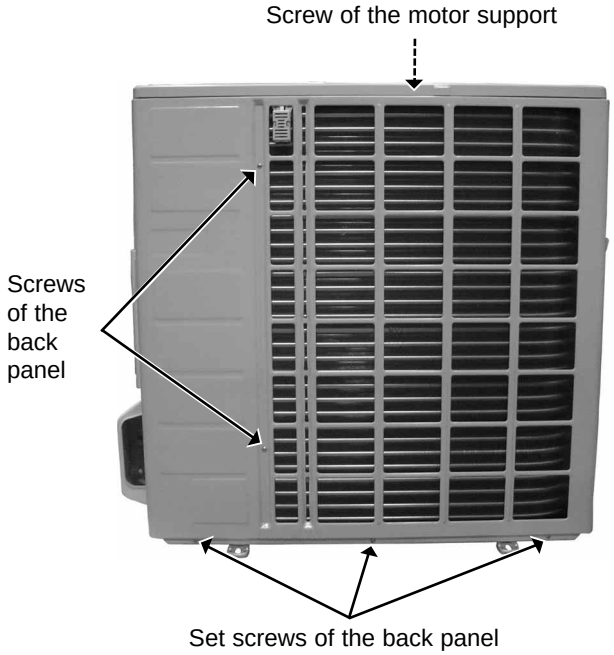
NOTE : These photos are MUH-A30WV.
MUH-A24WV is almost the same as MUH-A30WV.

OPERATING PROCEDURE

1.Removing the cabinet

(1) Remove the screws of the service panel.
(2) Remove the screws of the top panel.
(3) Remove the screw of the valve cover.
(4) Remove the service panel.
(5) Remove the top panel.
(6) Remove the valve cover.
(7) Remove the screws of the front panel.
(8) Remove the front panel.
(9) Remove the screws of the back panel.
(10) Remove the back panel.

Photo 3



PHOTOS

Photo 1

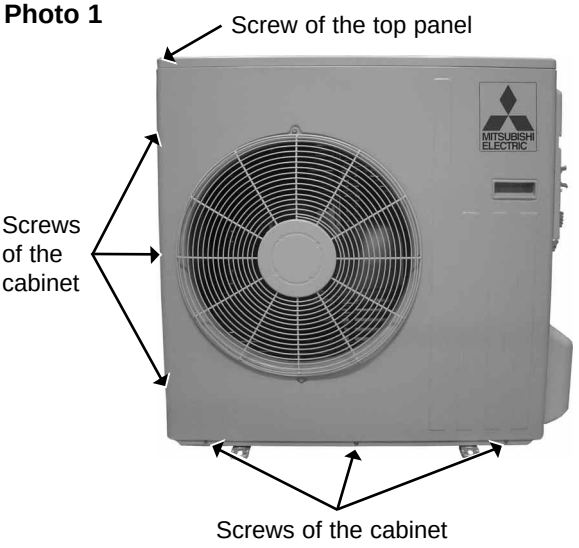
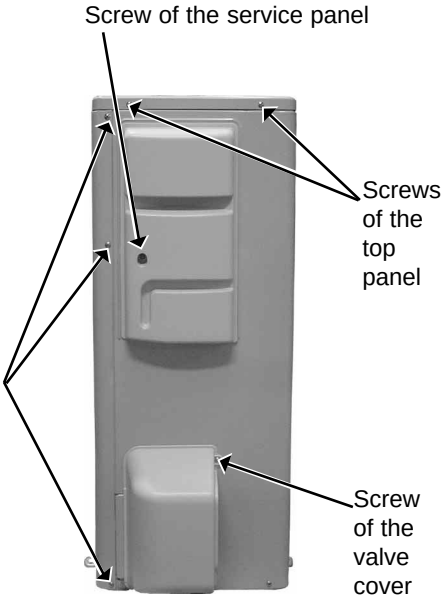


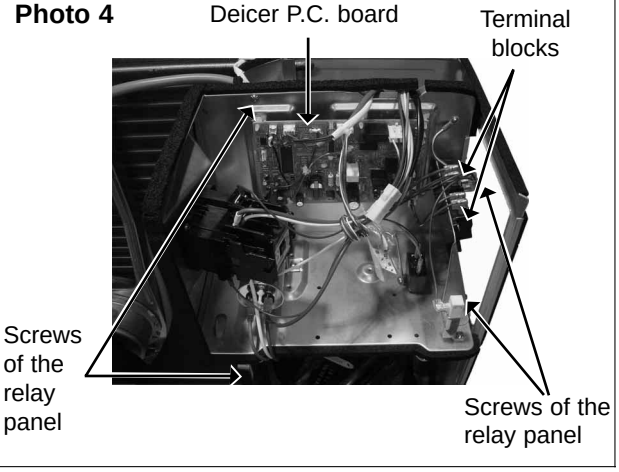
Photo 2

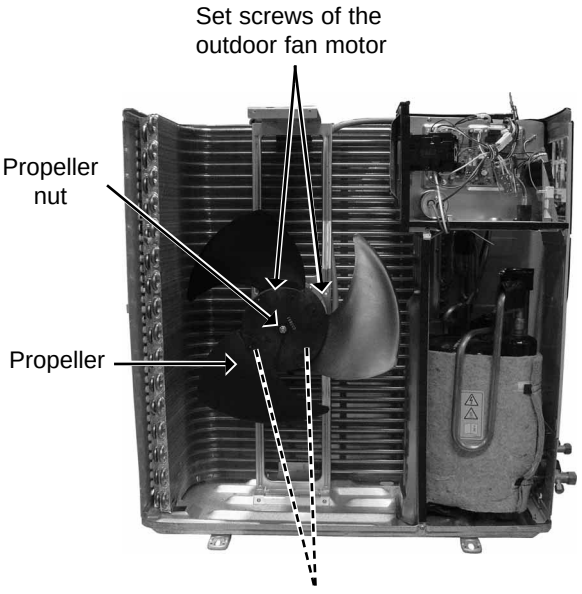
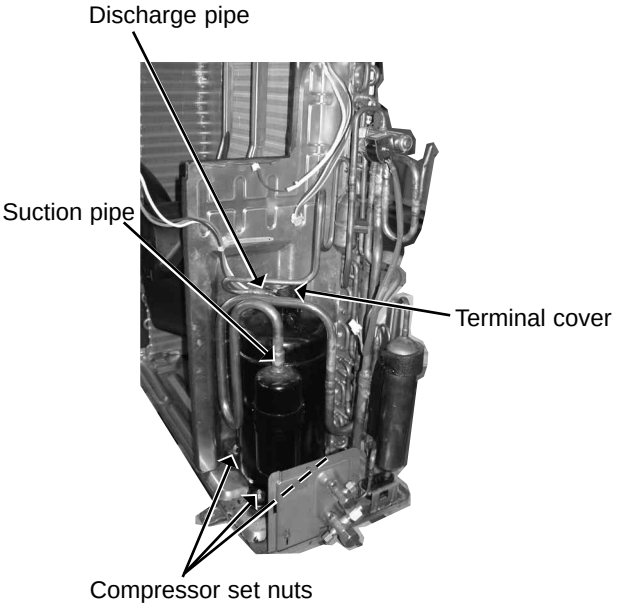


2. Removing the deicer P.C. board

(1) Remove the service panel and the cabinet.
(2) Disconnect all the connectors and the terminals on the deicer P.C. board.
(3) Remove the deicer P.C. board.

Photo 4

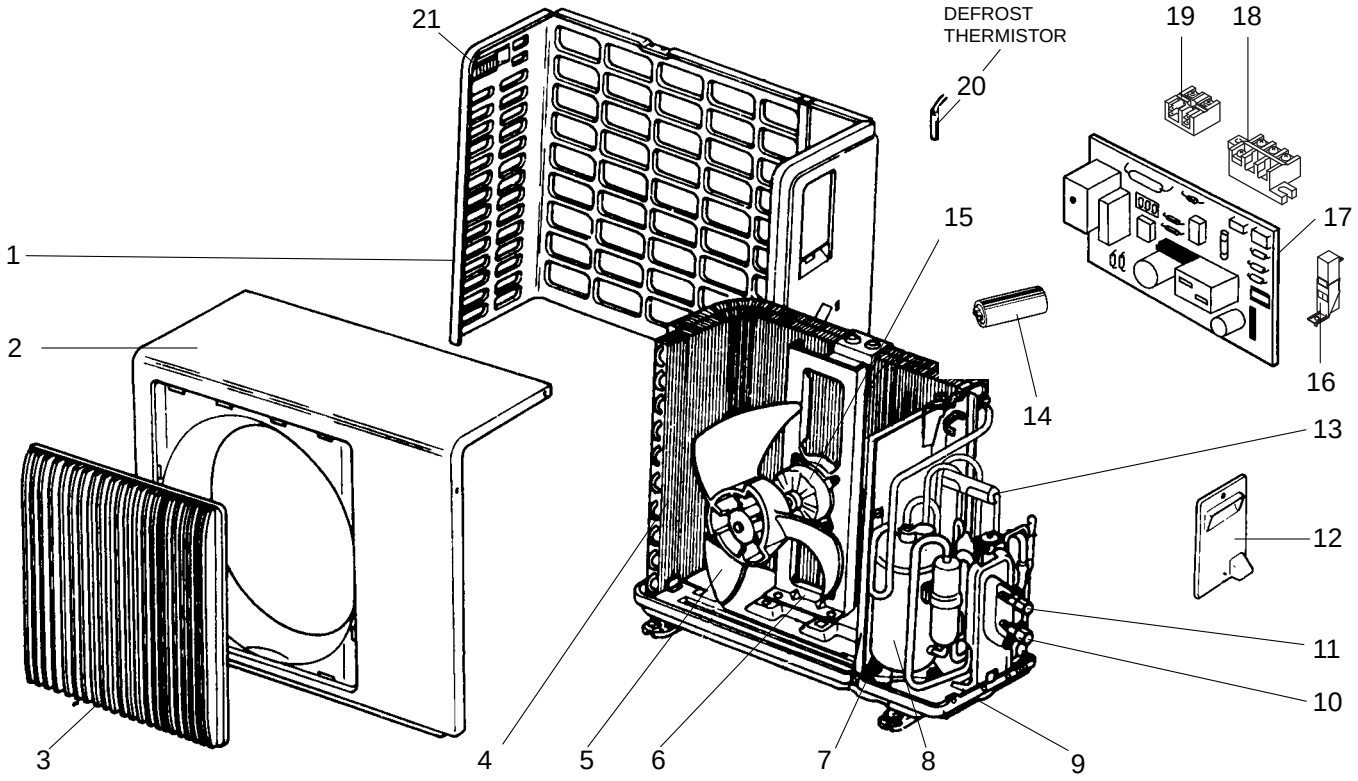


OPERATING PROCEDURE	PHOTOS
3. Removing the propeller and the outdoor fan motor (1) Remove the cabinet. (Refer to 1.) (2) Remove the propeller nut and the propeller. **NOTE : Loose the propeller in the rotating direction for removal.** When attaching the propeller, align the mark on the propeller and the motor shaft cut section. Set the propeller fan in position by using the cut on the shaft and the mark on the propeller. (3) Remove the clamp of outdoor fan motor lead wire and disconnect the outdoor fan motor connector. (4) Remove the screws fixing the outdoor fan motor. (5) Remove the outdoor fan motor.	**Photo 5** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1.) (2) Remove the relay panel. (3) Remove the soundproof felt. (4) Remove the terminal cover on the compressor. (5) Disconnect lead wires from the compressor. (6) Recover gas from the refrigerant circuit. (7) Disconnect the welded part of the discharge pipe. (8) Disconnect the welded part of the suction pipe. (9) Remove nuts fixing the compressor. (10) Remove the compressor. **NOTE** ● Before using a burner, reclaim gas from the pipes until the pressure gauge shows 0 kg/cm^2 (0 MPa). ● Use the burner under the condition that gas can be recovered even when the inner pressure rises by heat.	**Photo 6** 

13 PARTS LIST

MUH-A18WV -E1

13-1. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS

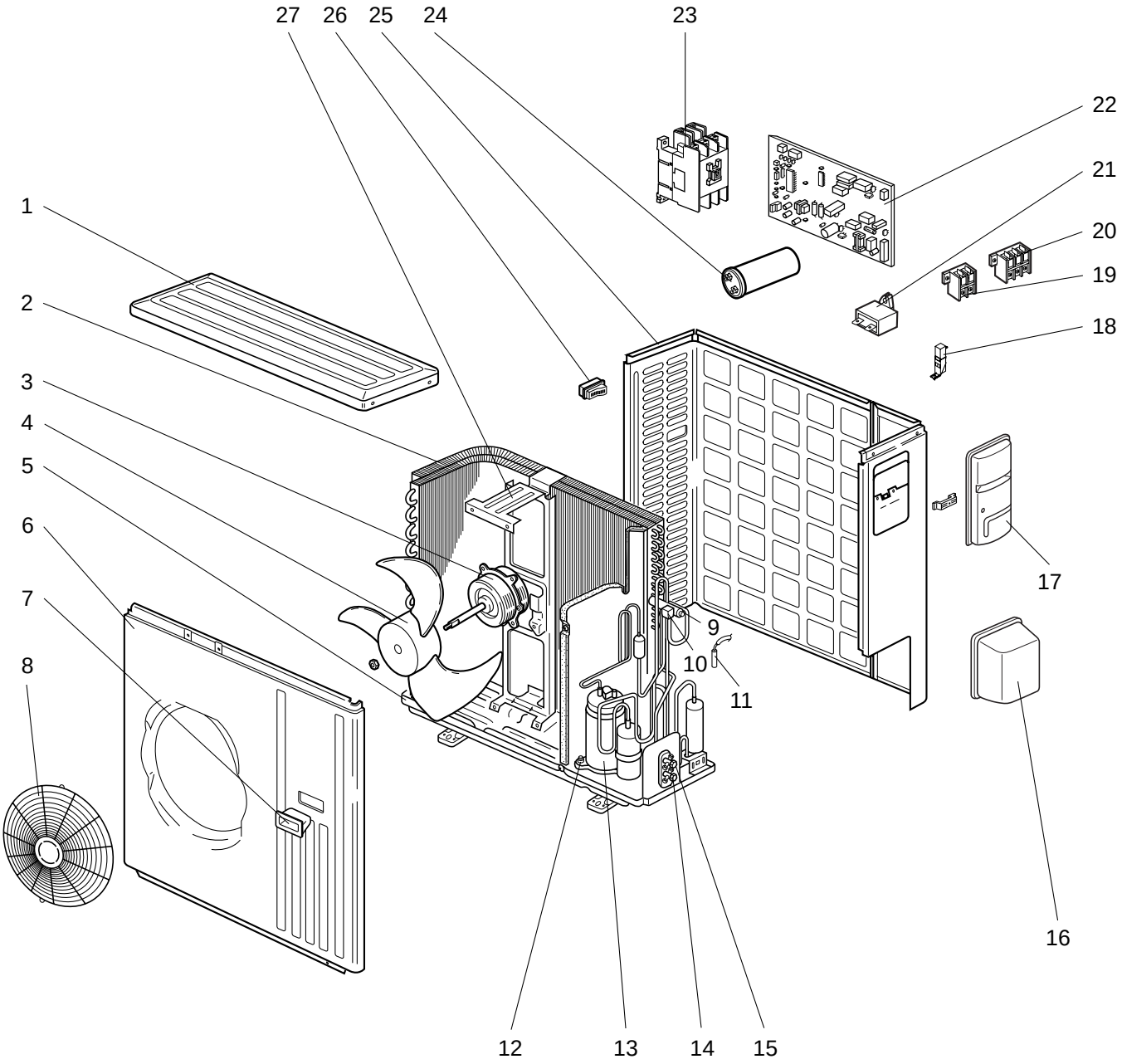


Part numbers that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit MUH-A18WV-E1	Remarks
1	E02 817 233	BACK PANEL		1	
2	E02 817 232	CABINET		1	
3	E02 817 521	GRILLE		1	
4	E02 643 630	OUTDOOR HEAT EXCHANGER		1	
5	E02 141 501	PROPELLER		1	
6	E02 139 515	MOTOR SUPPORT		1	
7	E02 075 506	COMPRESSOR RUBBER SET		3	3RUBBERS/SET
8	E02 817 900	COMPRESSOR	MC	1	RN196VHSHT
9	E02 817 290	BASE		1	
10	E02 817 661	STOP VALVE(GAS)		1	ϕ12.7
11	E02 820 662	STOP VALVE(LIQUID)		1	ϕ 6.35
12	E02 817 245	SERVICE PANEL		1	
13	E02 679 961	4-WAY VALVE		1	
14	E02 817 353	COMPRESSOR CAPACITOR	C1	1	40μF/440V AC
15	E02 144 301	OUTDOOR FAN MOTOR	MF	1	RA6V50 - □□
16	E02 466 383	SURGE ABSORBER	DSAR	1	
17	E02 820 451	DEICER P.C. BOARD		1	
18	E02 817 374	TERMINAL BLOCK	TB1	1	3P
19	E02 821 374	TERMINAL BLOCK	TB2	1	2P
20	E02 820 310	DEFROST THERMISTOR	RT61	1	
21	E02 817 009	HANDLE		1	
(22)	E02 139 936	CAPILLARY TUBE		2	ϕ3.0Xϕ1.6X750
	E02 340 936	CAPILLARY TUBE		1	ϕ3.0Xϕ1.6X450
	E02 414 936	CAPILLARY TUBE		1	ϕ3.0Xϕ1.6X300
	E02 820 936	CAPILLARY TUBE		1	ϕ2.5Xϕ0.6X1000
(23)	E02 095 382	FUSE	F61	1	250V / 2A
(24)	E02 821 490	R.V. COIL	21S4	1	
(25)	E02 154 642	CHECK VALVE		1	
(26)	E02 820 385	VARISTOR	NR61	1	

MUH-A24WV -E1

13-2. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS



MUH-A24WV - E1

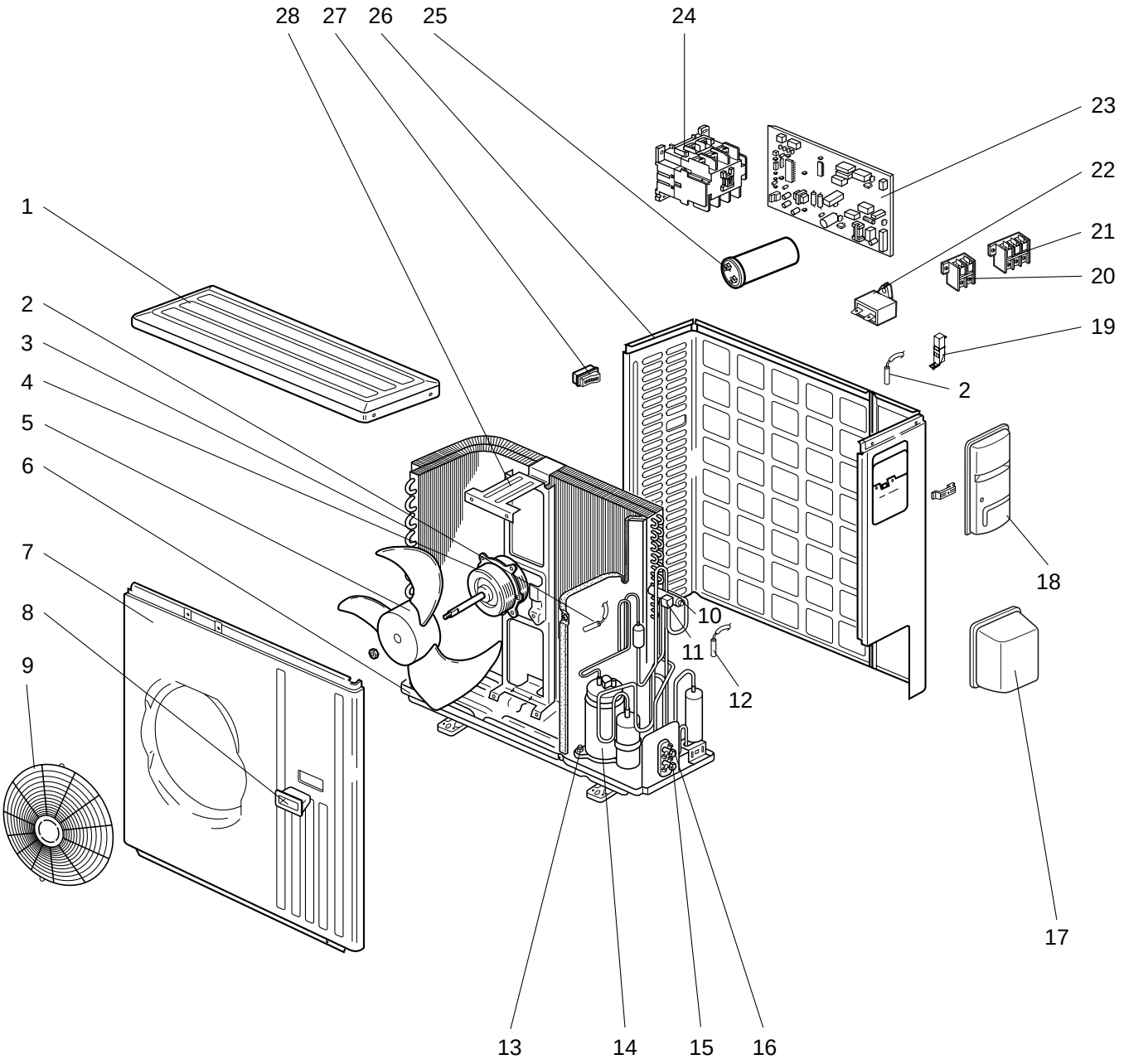
13-2. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS

Part numbers that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MUH-A24WV - E1	
1	E02 819 297	TOP PANEL		1	
2	E02 821 630	OUTDOOR HEAT EXCHANGER		1	
3	E02 821 301	OUTDOOR FAN MOTOR	MF	1	RA6V85- □□
4	E02 214 501	PROPELLER		1	
5	E02 821 290	BASE		1	
6	E02 819 232	CABINET		1	
7	E02 819 009	HANDLE		1	
8	E02 819 521	FAN GUARD		1	
9	E02 679 961	4-WAY VALVE		1	
10	E02 821 490	R.V. COIL	21S4	1	
11	E02 821 310	DEFROST THERMISTOR	RT61	1	
12	E02 527 506	COMPRESSOR RUBBER SET		4	4RUBBERS/SET
13	E02 821 900	COMPRESSOR	MC	1	NN29VBAHT
14	E02 819 661	STOP VALVE(GAS)		1	ϕ15.88
15	E02 821 662	STOP VALVE(LIQUID)		1	ϕ6.35
16	E02 819 650	VALVE COVER		1	
17	E02 819 245	SERVICE PANEL		1	
18	E02 128 383	SURGE ABSORBER	DSAR	1	
19	E02 821 374	TERMINAL BLOCK	TB2	1	2P
20	E02 817 374	TERMINAL BLOCK	TB1	1	3P
21	E02 138 351	OUTDOOR FAN CAPACITOR	C2	1	3.0μF/440V AC
22	E02 821 451	DEICER P.C. BOARD		1	
23	E07 012 340	COMPRESSOR CONTACTOR	52C	1	
24	E02 818 353	COMPRESSOR CAPACITOR	C1	1	55μF/440V AC
25	E02 819 233	BACK PANEL(OUT)		1	
26	E02 817 009	HANDLE		1	
27	E02 726 515	MOTOR SUPPORT		1	
㉘	E02 127 382	FUSE	F61	1	250V/3.15A
㉙	E02 336 385	VARISTOR	NR61	1	
㉚	E02 154 642	CHECK VALVE		1	
㉛	E02 625 936	CAPILLARY TUBE		1	ϕ3.0xϕ2.0x550
	E02 010 936	CAPILLARY TUBE		1	ϕ3.0xϕ2.0x650

MUH-A30WV - E1

13-3. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS



MUH-A30WV - E1

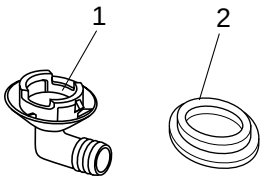
13-3. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS

Part numbers that are circled are not shown in the illustration.

NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit	Remarks
				MUH-A30WV - E1	
1	E02 819 297	TOP PANEL		1	
2	E02 819 309	THERMISTOR	RT62, RT63	1	DISCHARGE, AMBIENT
3	E02 822 630	OUTDOOR HEAT EXCHANGER		1	
4	E02 819 301	OUTDOOR FAN MOTOR	MF	1	RA6V75- □□
5	E02 214 501	PROPELLER		1	
6	E02 819 290	BASE		1	
7	E02 819 232	CABINET		1	
8	E02 819 009	HANDLE		1	
9	E02 819 521	FAN GUARD		1	
10	E02 679 961	4-WAY VALVE		1	
11	E02 821 490	R.V. COIL	21S4	1	
12	E02 821 310	DEFROST THERMISTOR	RT61	1	
13	E02 527 506	COMPRESSOR RUBBER SET		4	4RUBBERS/SET
14	E02 819 900	COMPRESSOR	MC	1	NN37VAAHT
15	E02 819 661	STOP VALVE(GAS)		1	ϕ15.88
16	E02 822 662	STOP VALVE(LIQUID)		1	ϕ9.52
17	E02 819 650	VALVE COVER		1	
18	E02 819 245	SERVICE PANEL		1	
19	E02 128 383	SURGE ABSORBER	DSAR	1	
20	E02 821 374	TERMINAL BLOCK	TB2	1	2P
21	E02 817 374	TERMINAL BLOCK	TB1	1	3P
22	E02 064 351	OUTDOOR FAN CAPACITOR	C2	1	4.0μF/440V AC
23	E02 822 451	DEICER P.C. BOARD		1	
24	E02 819 340	COMPRESSOR CONTACTOR	52C	1	
25	E02 819 353	COMPRESSOR CAPACITOR	C1	1	60μF/440V AC
26	E02 819 233	BACK PANEL(OUT)		1	
27	E02 817 009	HANDLE		1	
28	E02 726 515	MOTOR SUPPORT		1	
(29)	E02 819 640	EXPANSION VALVE		1	
(30)	E02 819 493	EXPANSION VALVE COIL	LEV	1	
(31)	E02 127 382	FUSE	F61	1	250V/3.15A
(32)	E02 336 385	VARISTOR	NR61	1	
(33)	E02 214 386	CZ SURGE ABSORBER	CZ	1	
(34)	E02 822 936	CAPILLARY TUBE(TAPER PIPE)		1	ϕ3.6xϕ2.4x50

MUH-A18WV -E1
MUH-A24WV -E1
MUH-A30WV -E1

13-4. ACCESSORY



NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit			Remarks
				MUH-A18WV-E1	MUH-A24WV-E1	MUH-A30WV-E1	
1	E02 817 704	DRAIN SOCKET		1	1	1	
2	E02 444 705	DRAIN CAP		2	2	2	ϕ33
	E02 444 706	DRAIN CAP		1			ϕ16

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